PICTORIAL WOODWORK

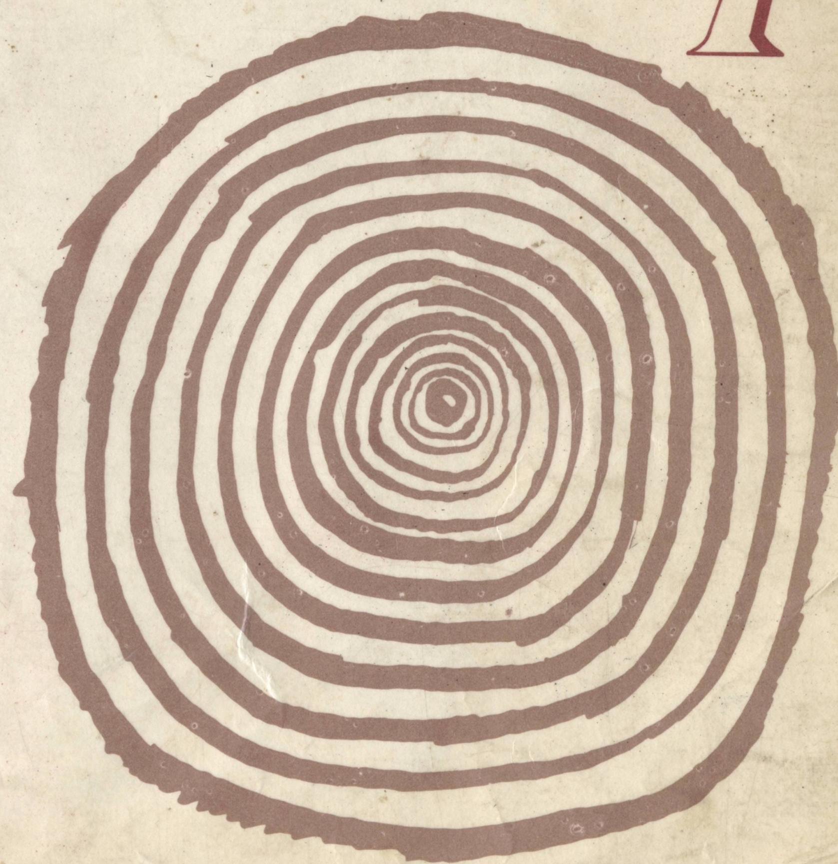
J Matthews & J D Kerr

木材基础知识·结构·涂饰

木工图集

1





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出 版 说 明

本书是根据英国爱德华·阿诺德出版公司（EDWARD ARNOLD PUBLISHERS LTD）为我社提供的英文原本进行注译的，分三册出版。全书以图示的方式系统地介绍了各种树材、木结构和木工工具的基本知识，详细地传授了木工、油漆、组装和设计等方面的基本原理和合理的操作方法。图示准确详实，清楚易懂，有望图知意的效果，是木工专业学校的良好教材，又是在业木工、油漆工、家具设计人员以及业余木工爱好者最好的学习和参考书籍。注译中注意到了结合我国木工工程惯用名称和计量标准认真进行核订，以求适于我国读者使用。对爱德华·阿诺德出版公司所给予的友好赞助，谨此表示感谢。

编 者

1984年5月1日

第 一 集 提 要

对于任何从事产品制作的人来说，掌握用以被加工的材料的知识是首要的。本集将首先传授木材的基础知识。先讲种子如何发育成树木，再介绍八种人们所熟知的木材树种，指出世界硬木和软木林区，然后叙述适于木工工作台操作的加工方法、从森林到锯木厂的运输、加工和干燥过程。

人造板在许多方面都是木工的珍贵材料。为此，本集特收三种主要类型——胶合板、细木工板和硬质纤维板——加以介绍，并就它们的制作方法和用途加以阐述。

各种结构的方法是木工应当熟知的。这里收集了主要结构型式，包括对接、搭接、燕尾榫接以及胶、圆钉、螺钉、合页等连接结构。

由于涂饰能提供防护性和赏心悦目的外观，是普遍为人们所重视的，因而本集以很大的篇幅来介绍它。

（根据原著本册前言编译）

目　录

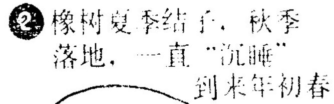
由种子到树木：1

生长阶段

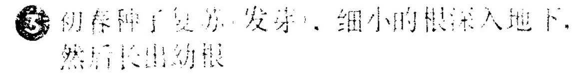
（以橡树，槲属橡为例）



❶ 橡树果实
橡树子含有种子



❷ 橡树夏季结子，秋季落地，一直"沉睡"到来年初春



❸ 初春种子复苏（发芽），细小的根深入地下，然后长出幼根



❹ 嫩芽伸长，长出树叶



❺ 秋天叶子停止生长，枯萎，落到地上



❻ 第二年春天冬芽绽开，长出新枝（幼枝）



❼ 多年以后，小小的种子长成大树

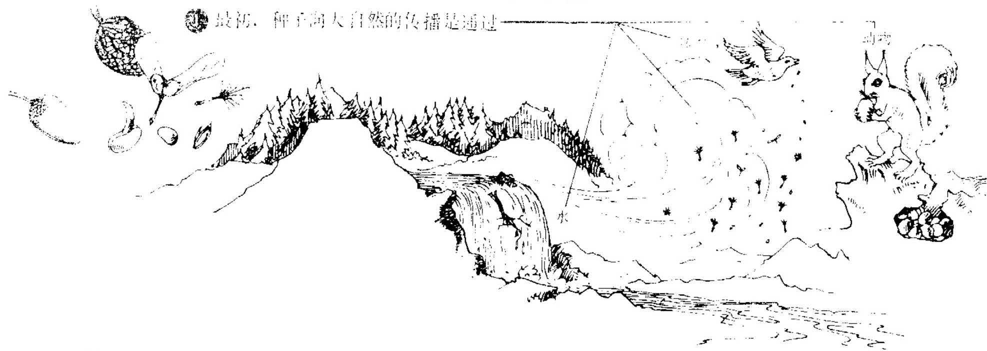


❽ 20～25年后，
树木开花，经过传花授粉，
结出橡树子，又开始一轮新的生命

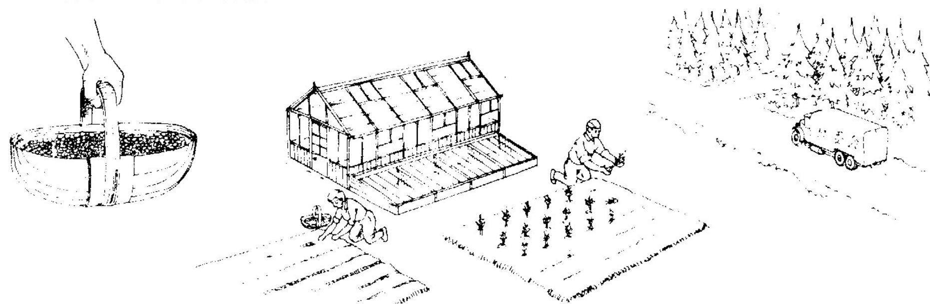
由种子到树木：2

种子的传播

❶ 最初，种子向大自然的传播是通过

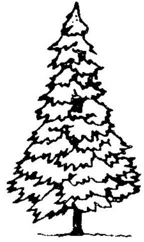


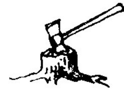
❷ 现在，人们采用收集种子，在苗圃内使种子发芽、育苗，然后移植到目的地的方法来帮助自然界



木 材 树 入 门:1

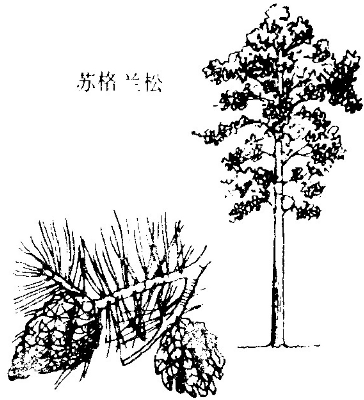
木材树是指能生成适于普通木工操作的木材的树木








儿种木材树种类











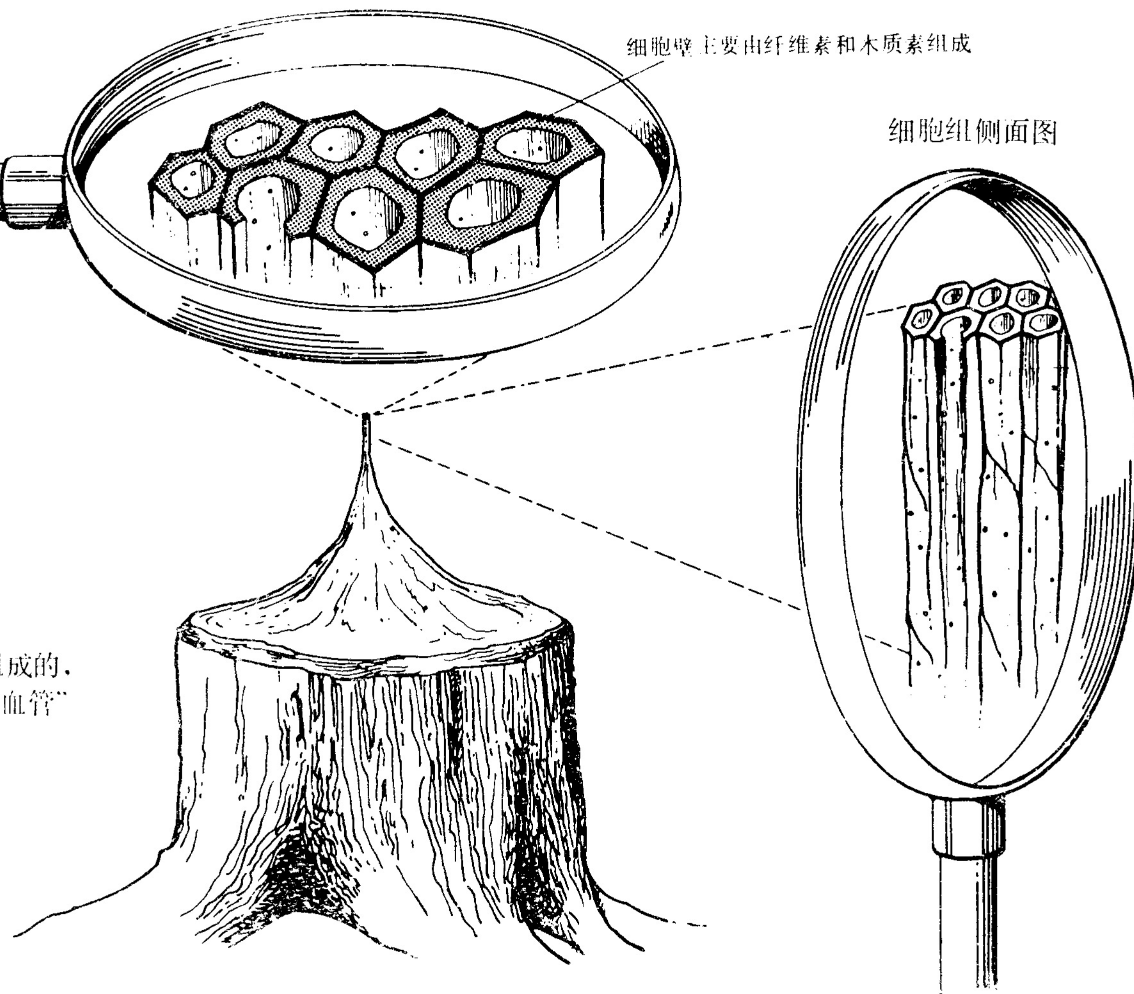


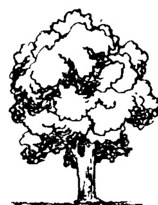




木材树入门：2

基本细胞详图





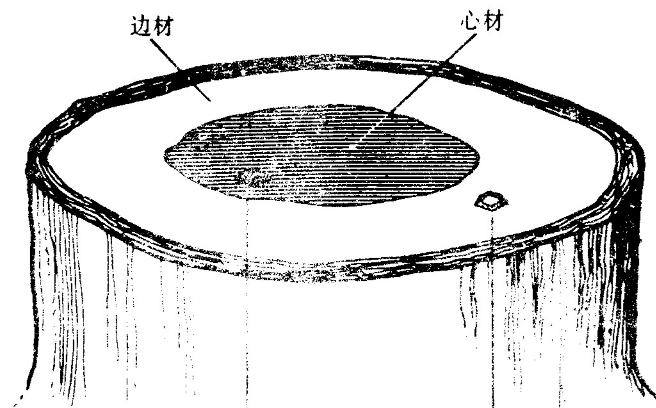
树木是由数十亿细小的细胞组成的，它们构成树木的"骨骼"和"血管"

木材树的各个部分：1

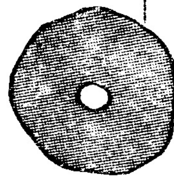
（以橡树，槲属橡为例）

基本横截面

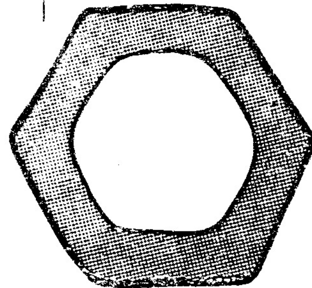
❶ 中心部位称为心材，周围部位称为边材，心材的颜色通常比边材深



❷ 心材细胞是老年细胞（它的细胞壁已经成熟变厚，木质化）

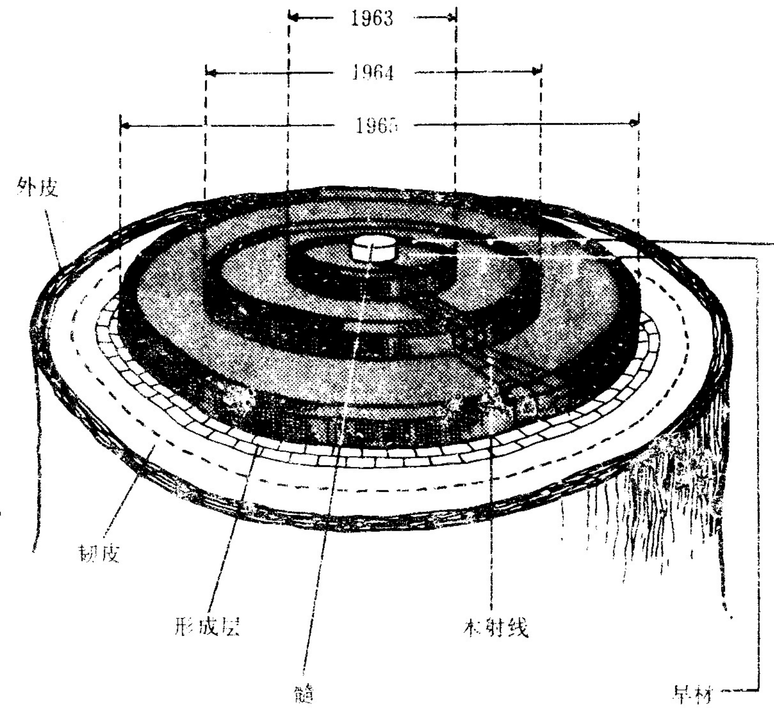


❸ 边材细胞是年幼细胞，它的细胞壁很薄，有输送水和溶盐的大腔



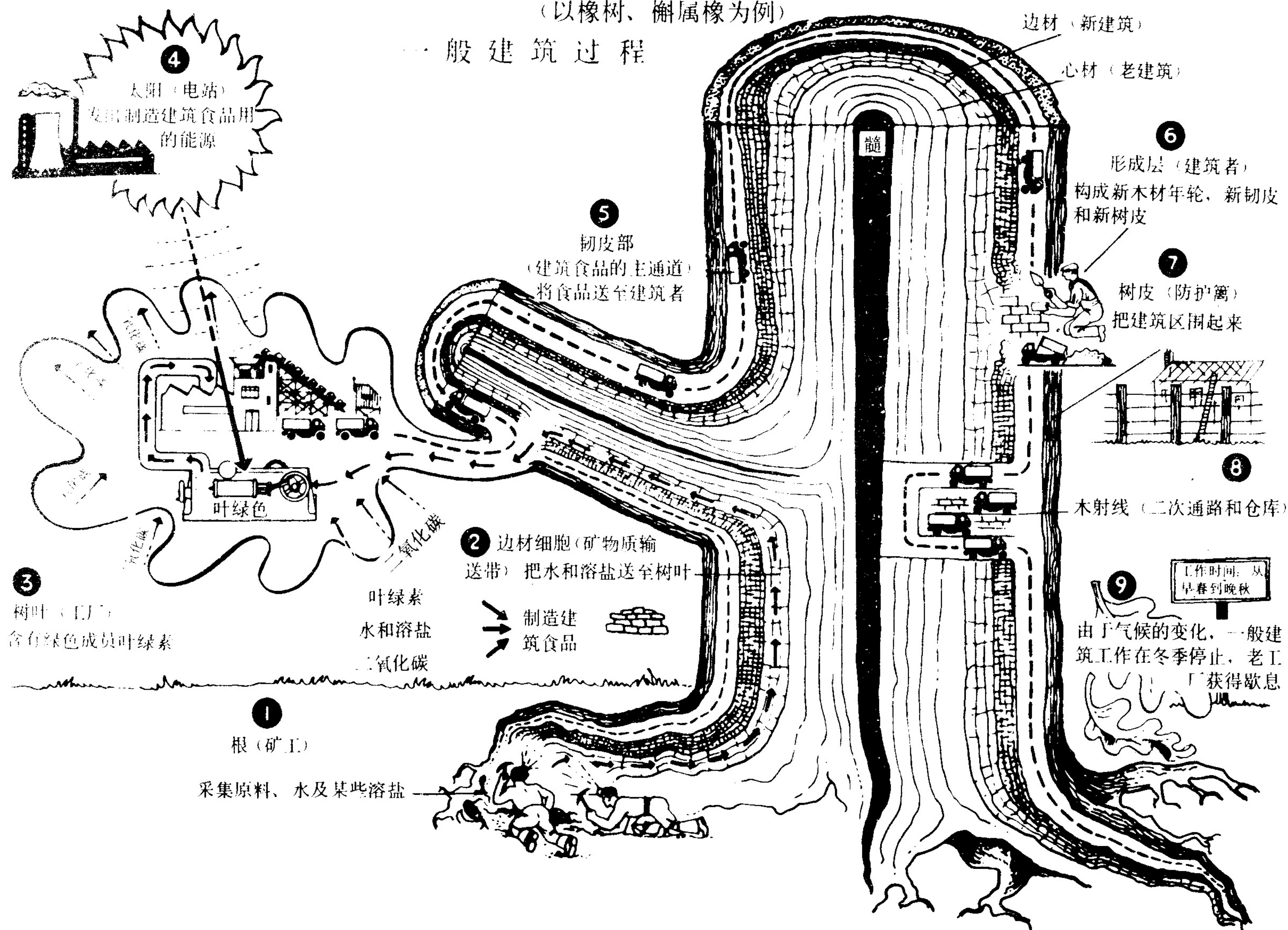
横截面详图

❹ 年轮



木材树的各个部分：2

（以橡树、槲属橡为例）

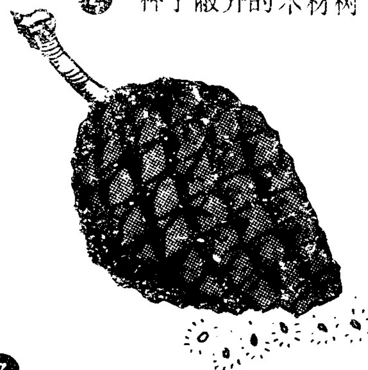


木 材 树

❶ 木材树有成千上万种不同的树种，

它们分为两大类

❷ 种子敞开的木材树（针叶树）



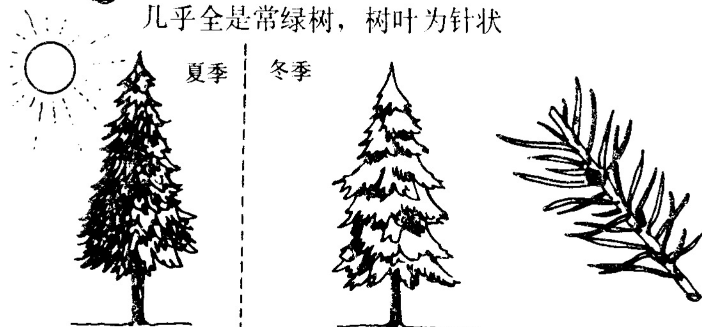
例如

冷杉

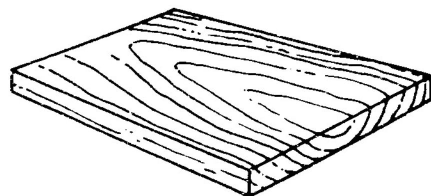
松树

云杉

❸ 几乎全是常绿树，树叶为针状

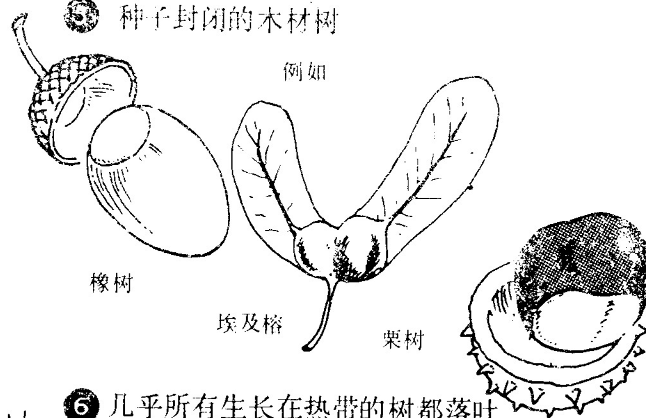


❹ 在商业上它们通称软木

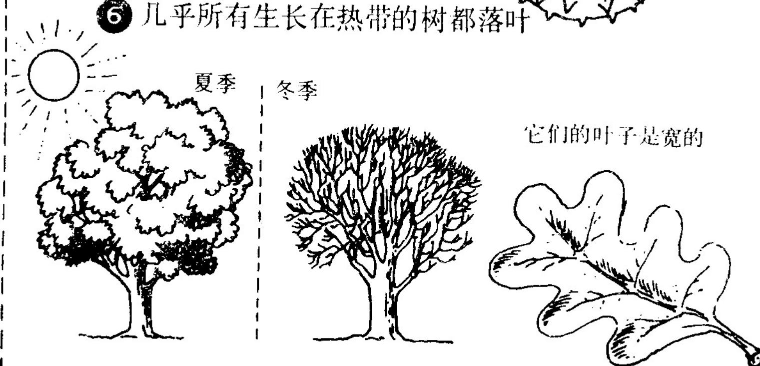


❺ 种子封闭的木材树

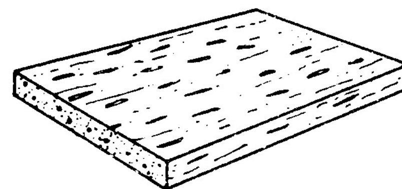
例如



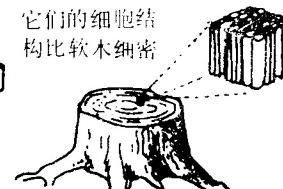
❻ 几乎所有生长在热带的树都落叶



❼ 在商业上它们通称硬木



它们的细胞结构比软木细密



软木区

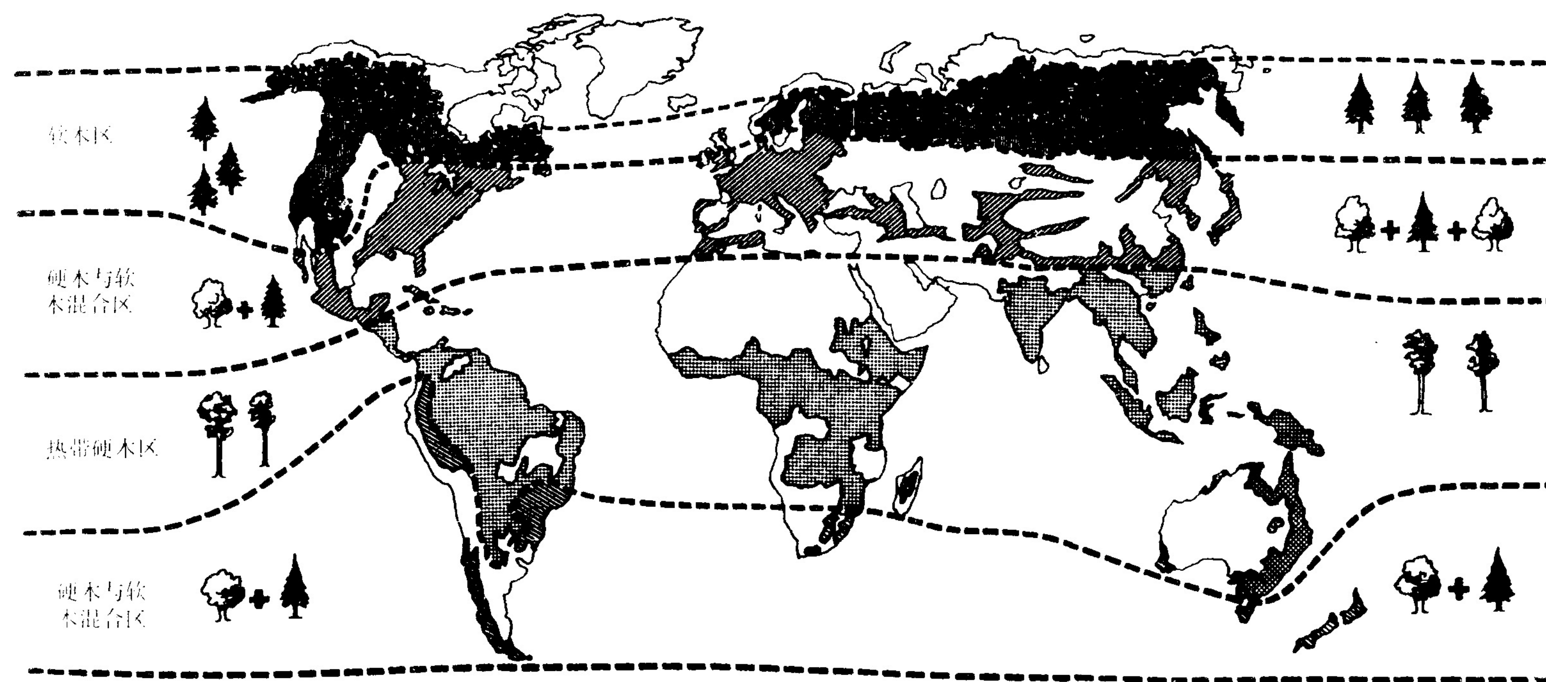
硬木与软木混合区

热带硬木

硬木与软木混合区

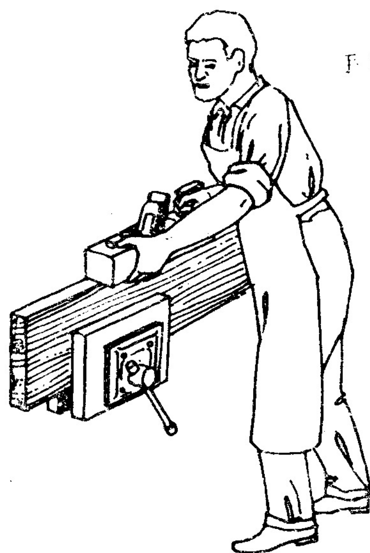
世 界 林 区

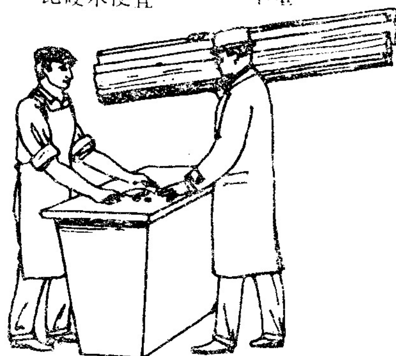
（图 线 部 分）

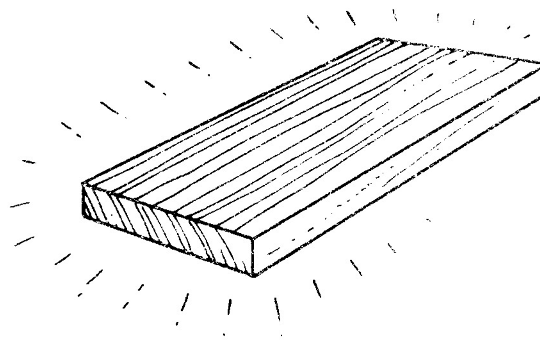


软 木 知 识

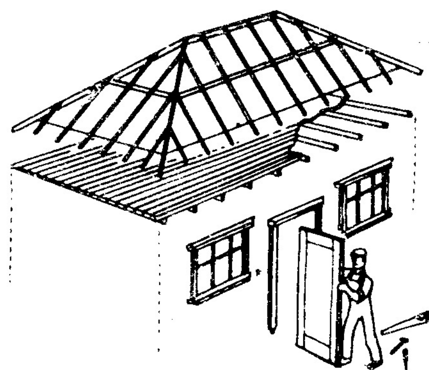
大部份软木

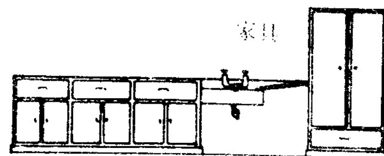




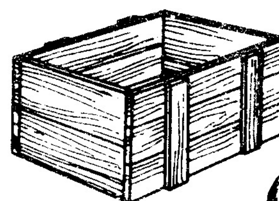


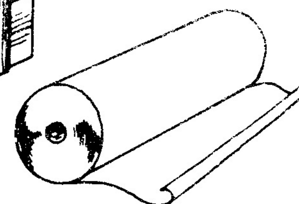
软木的一些普通用途











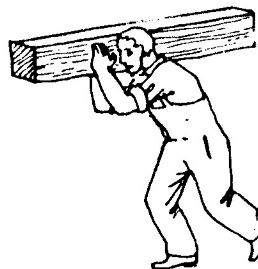
硬木知识

❶ 许多硬木

手工不易加工

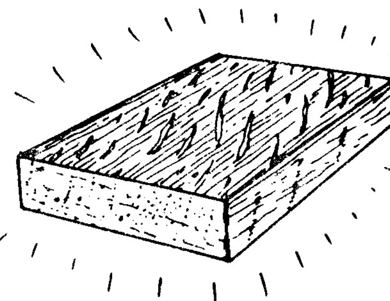


重



持久耐用，常产生引人注目的颜色、纹理、图案



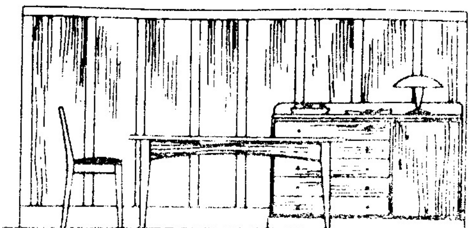


❷ 硬木的一些用途

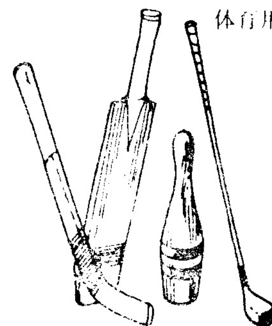
重型结构



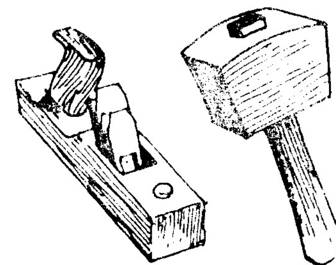
家具



体育用品



工具



木材的表面特征: 1

基本外观取决于天然的

1 颜色

例如

白梧桐(浅黄)

非洲核桃木(金黄到褐色)

2 结构

例如

埃及榕(细密)

橡树(粗糙)

3 纹理特性

例如

落叶松(直)

日本榆(不规则)

早林与晚材间的颜色差
(这常产生吸引人的花纹)

例如

北美油松

早材

晚材

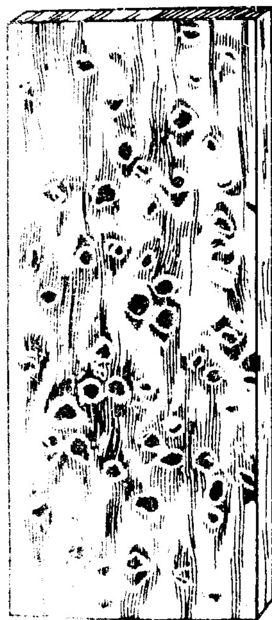


木材的表面特征: 2

❹ 特殊的表面特征

某些枫木上可能出现鸟眼纹

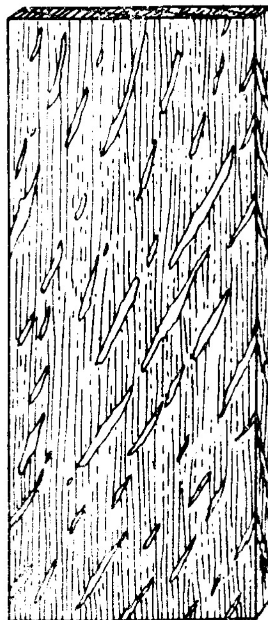
例如
岩枫



由内径卷所致

某些木材呈现大射线结，
它们常产生装饰性斑

例如
橡树



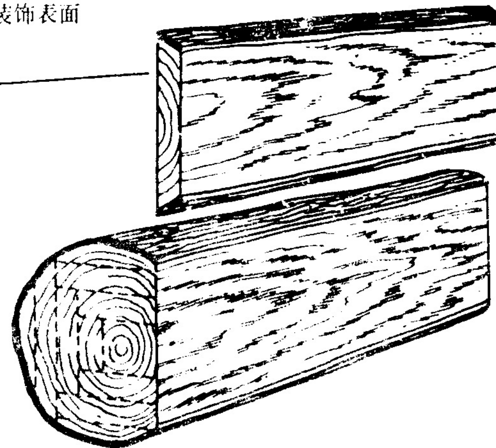
通称银线纹

❺ 注

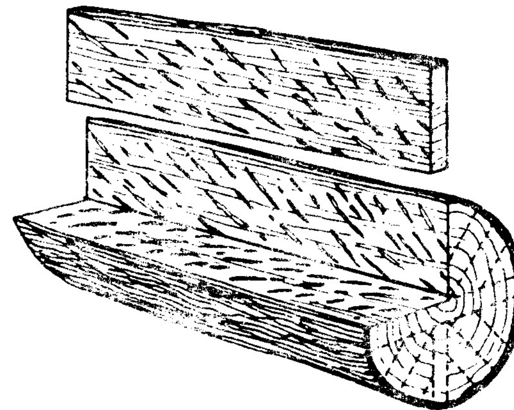
应采用一定的锯法锯切木板，
以最大限度地展现其装饰表面

例如

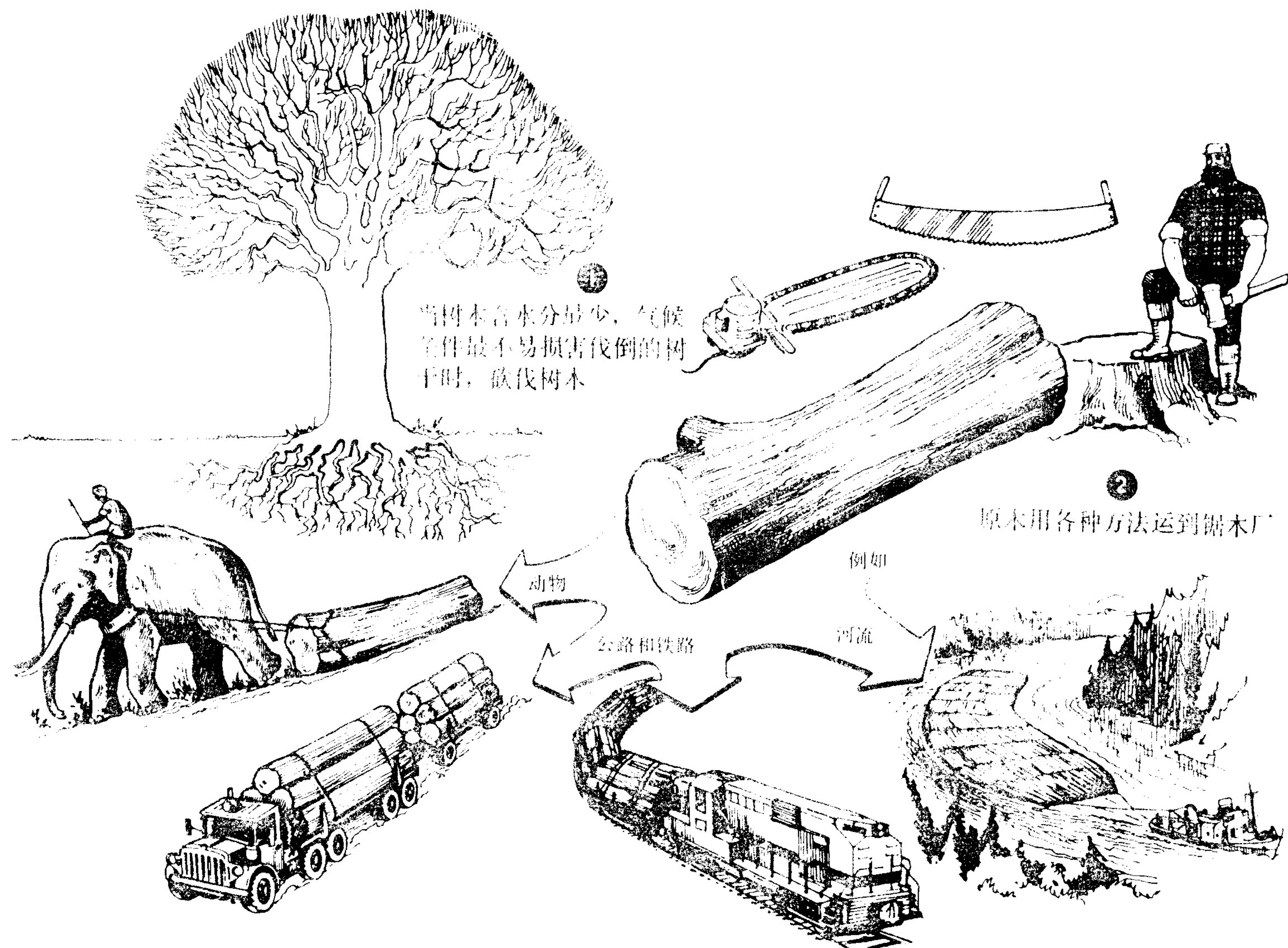
为充分展现道格拉斯冷杉的火焰状花纹，应进行弦切



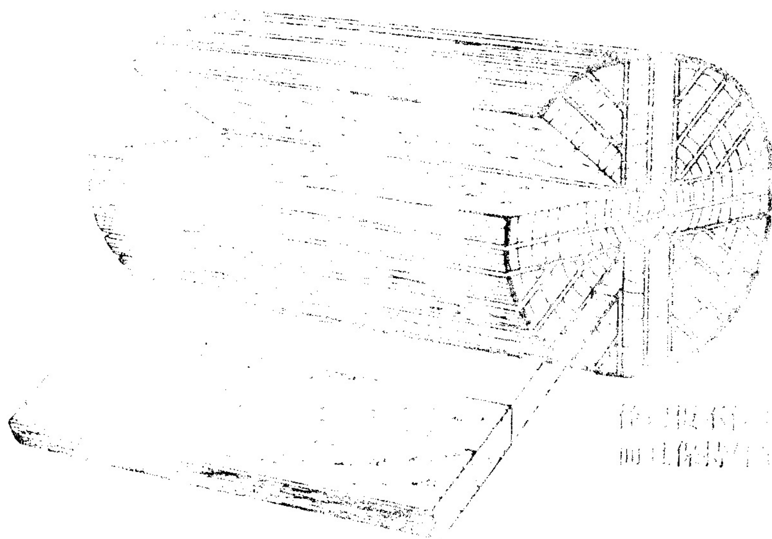
为展现橡木的银线纹，
应进行径切



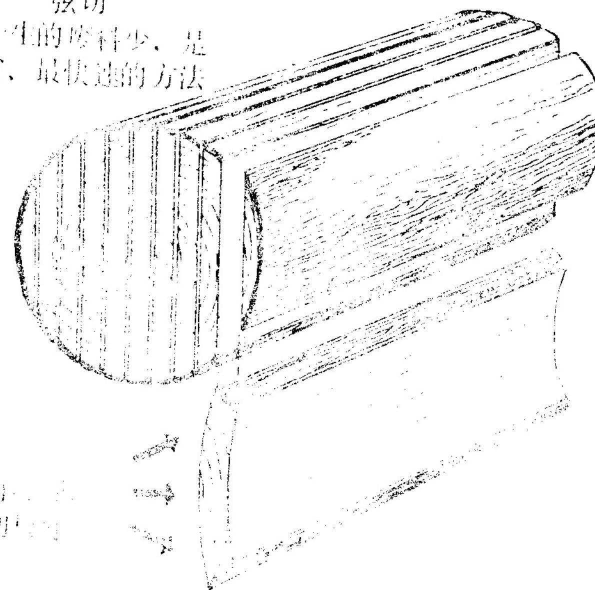
由森林到锯木厂

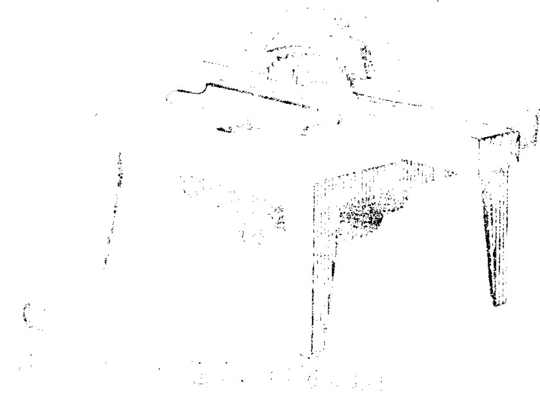

1
当树木含水分最少，气候条件最不易损害伐倒的树干时，砍伐树木
2
原木用各种方法运到锯木厂
例如
动物
公路和铁路
河流

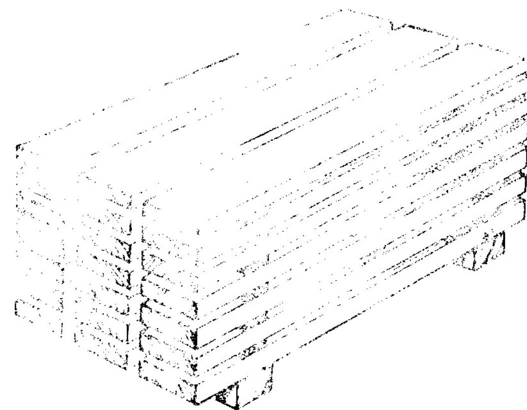
树干锯成木板的两种方法



②
弦切
本法产生的废料少、是
花费最省、最快速的方法

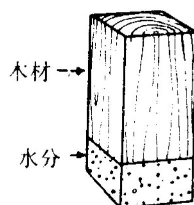




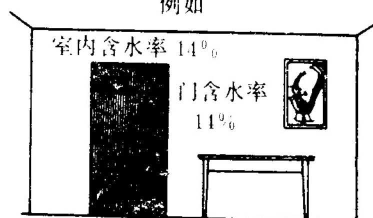


干 燥 入 门

❶ 在接受木材之前，木材必须部分干燥。木材的干燥过程称为木材干燥。木材干燥的主要目标是使木材的含水率与它的使用环境含水率平衡



例如



❼ 木材收缩和膨胀的原因
木材的作用象一块海绵



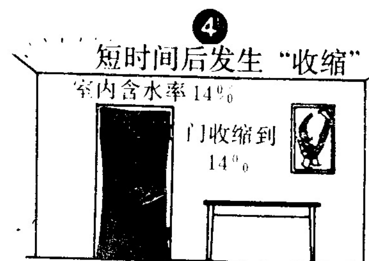
❷ 为什么含水率必须平衡

例 1

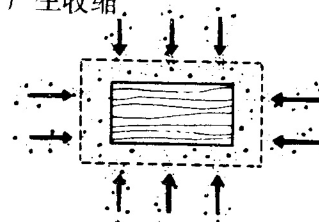
❸ 室内要装的门含水率不平衡



❹ 短时间后发生“收缩”



❽ 它的细胞可放出水分，产生收缩

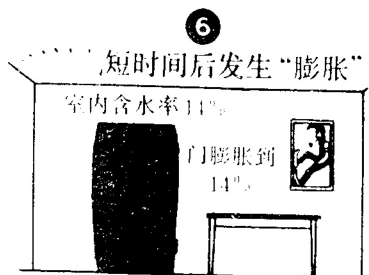


例 2

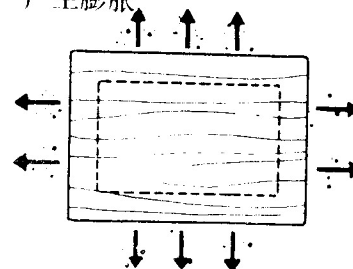
❺ 室内要装的门含水率不平衡

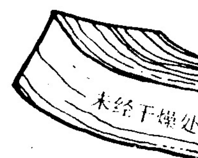


❻ 短时间后发生“膨胀”



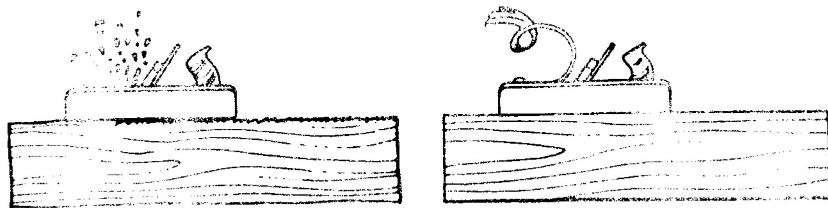
❾ 它的细胞可吸收水分，产生膨胀



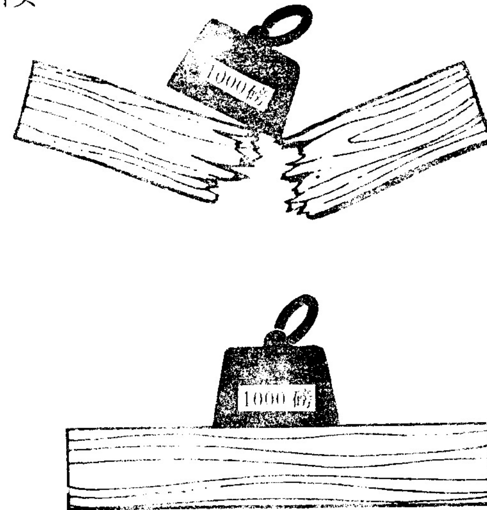


干燥木材的一些优点

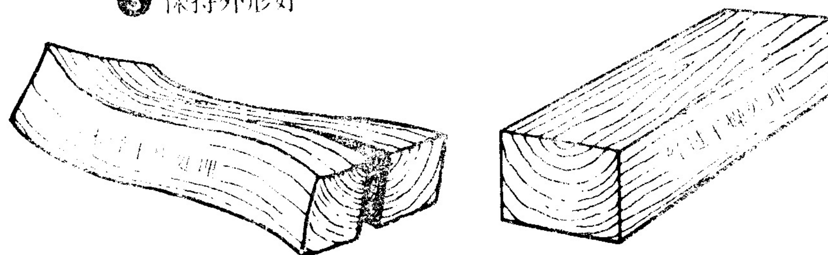
1 容易加工



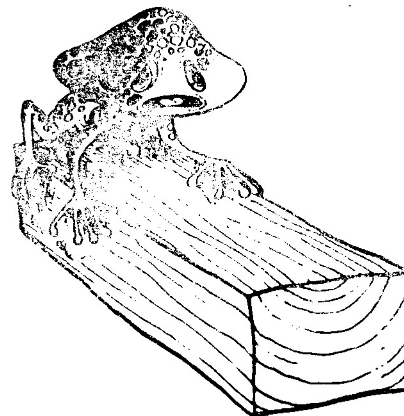
2 更结实



3 保持外形好



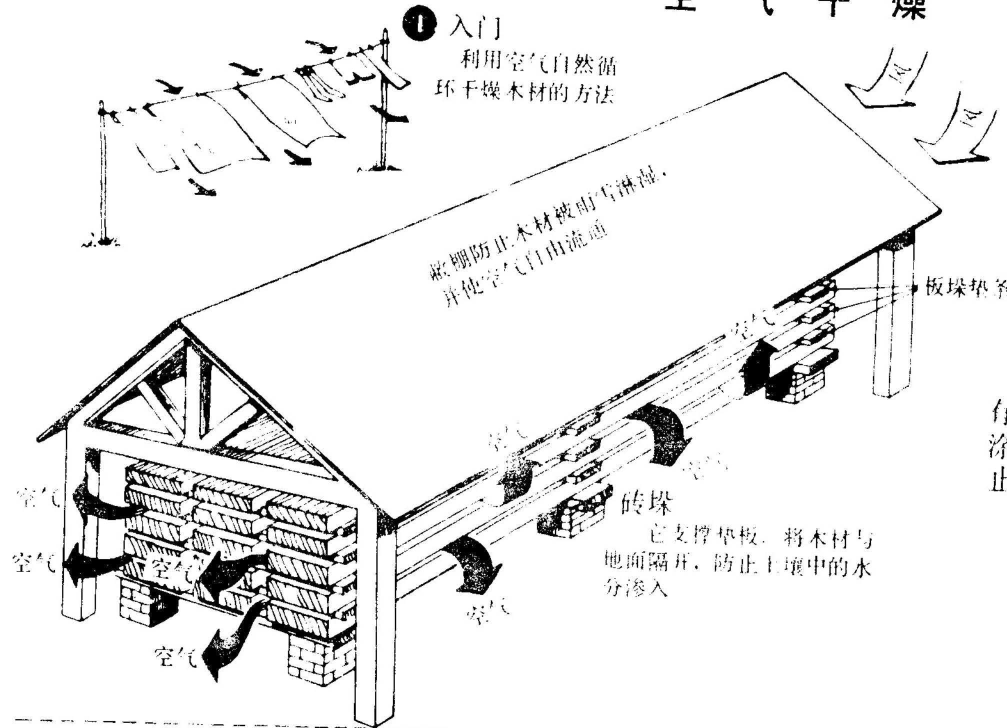
4 未干燥的木材吸引真[illegible]



空 气 干 燥

❶ 入门

利用空气自然循环干燥木材的方法



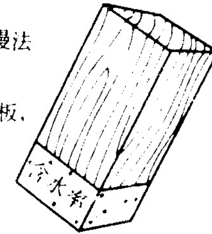
❷ 注

空气干燥是一种慢法

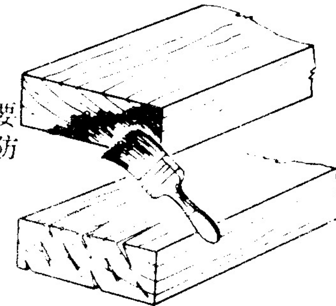
例如

干燥2"新橡木板，需要两年时间

干燥限度15



❸ 有时端面纹理要涂施弥缝剂，防止出现裂纹

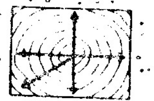


❹ 影响干燥周期的因素

截面类型

窄截面比宽截面干燥快

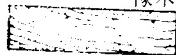




原因：水分在窄截面上通过的路程比宽截面短

木材的种类

橡木比云杉时间长



例如

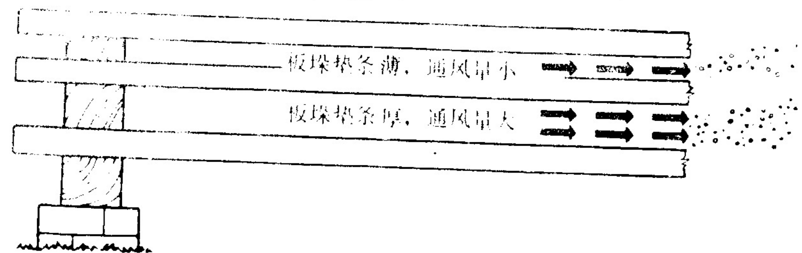


橡木的密度比云杉大，因此水分流通速度慢

板垛垫条的厚度

厚度越大，干燥越快

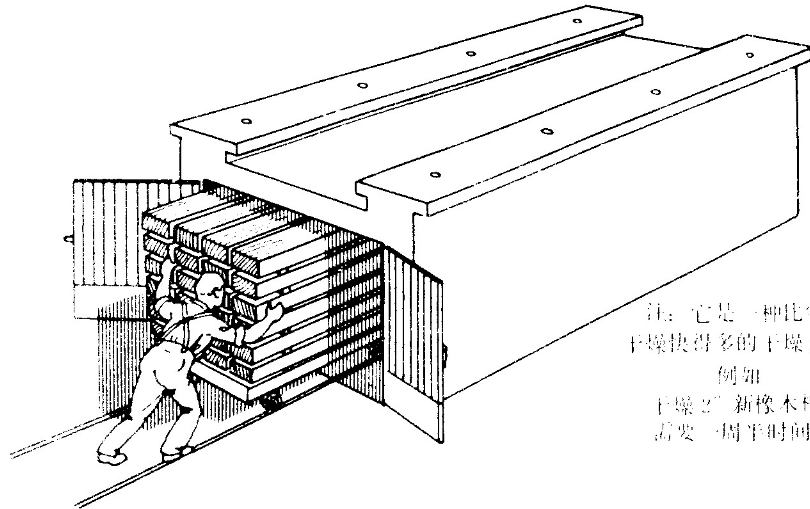
风和热量



窑　干

❶ 入门

在大型蒸汽窑中人工干燥木材的方法

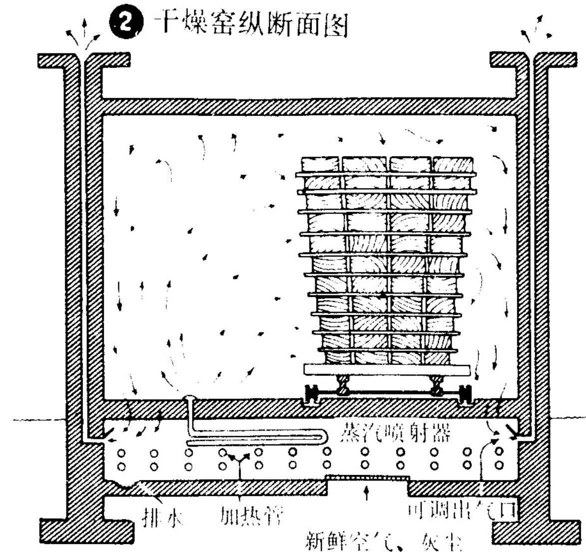


注：它是一种比空气干燥快得多的干燥方法

例如

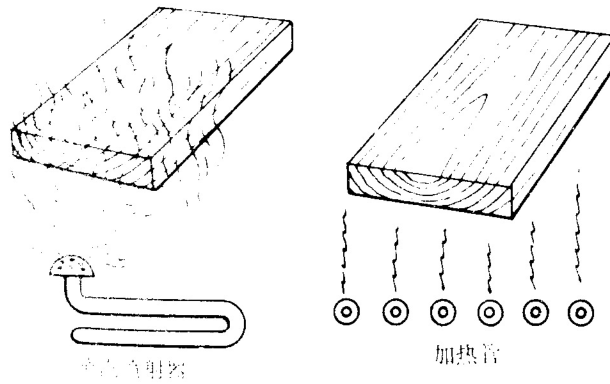
干燥2"新橡木板，需要一周半时间

❷ 干燥窑纵断面图



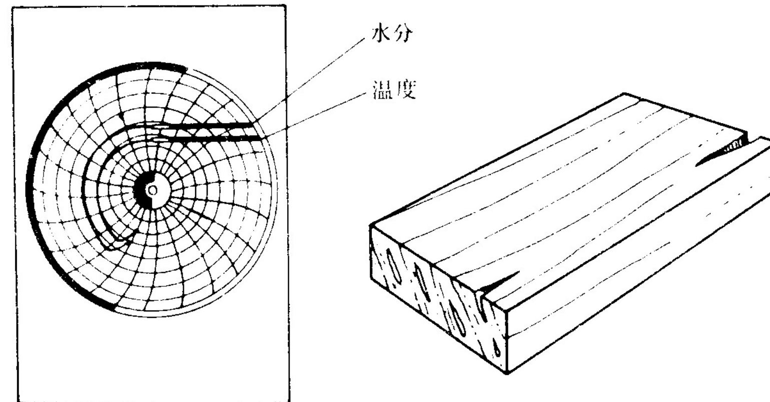
❸ 基本部件图

用蒸汽加热，木材很快便干燥到所要求的含水率



❹ 注

干燥过程需精心控制，否则会产生缺陷

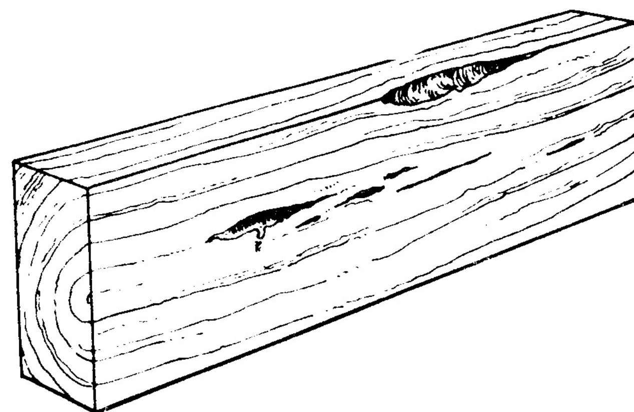


缺 陷 数 种:1

采伐环裂



树脂囊

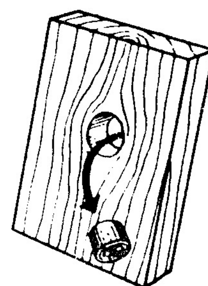


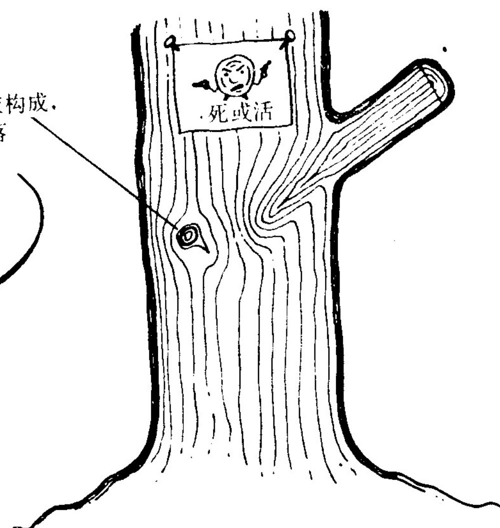
节

（树枝向内生长成为节）

死节

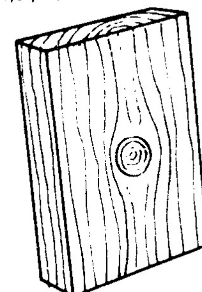
死节由受伤害的树枝构成，
干燥后死节松动脱落





活节

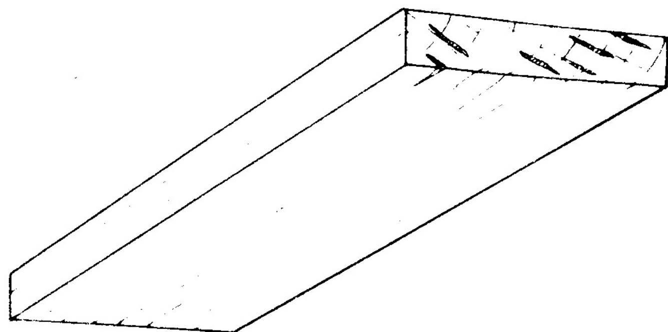
活节为健康而结实的节，
如果节不大，则为小缺陷



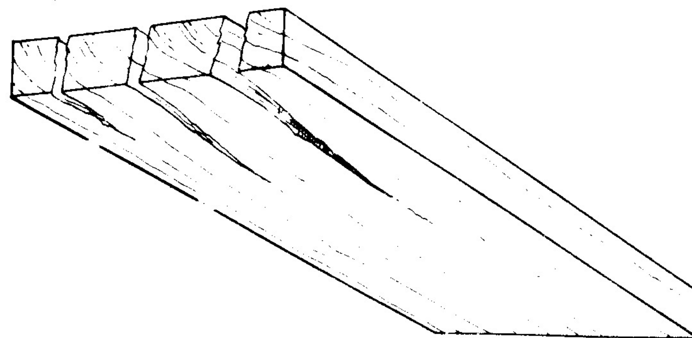
缺 陷 数 种：2

由干燥不匀造成的缺陷

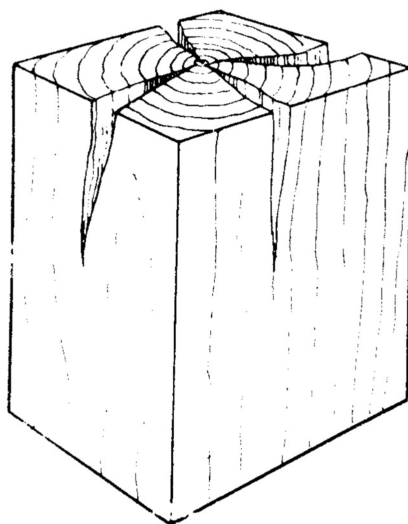
蜂窝裂



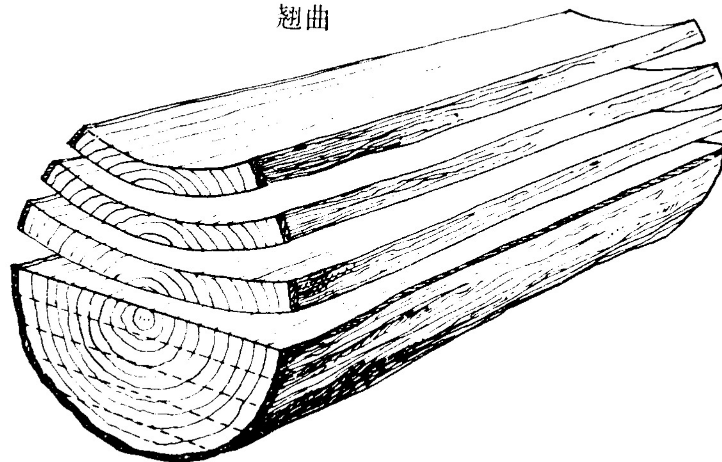
端裂



径裂



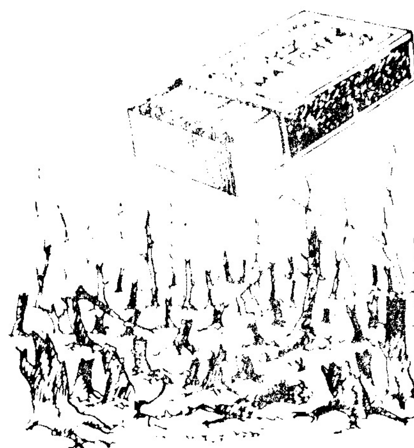
翘曲



树木的一些敌害

❶

人是林木的最大敌人，它对许多灾害性的火灾、成千上万的大片采伐林区，许多无动于衷的伤害负有责任



❷

注：林业工人辛辛苦苦护理树木从生到老因此不要胡闹!



❸

动物

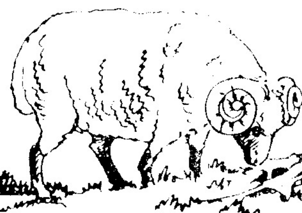
有些动物会造成大量损害

例如

兔子吃幼树芽

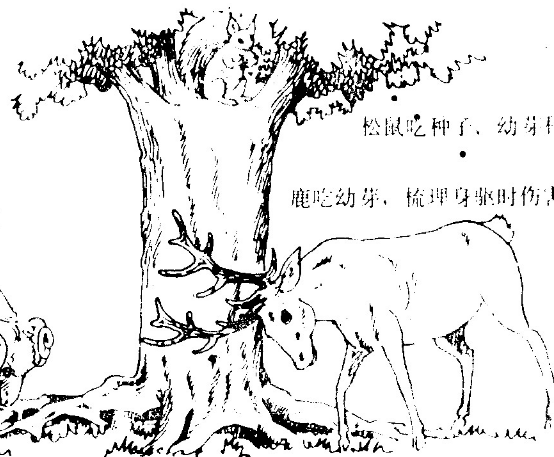


绵羊在放牧时常常伤害地表根



松鼠吃种子、幼芽和薄树皮

鹿吃幼芽，梳理身躯时伤害树皮



❹

昆虫

吃树的昆





❻

注

一些真菌

林木的一些敌害

④

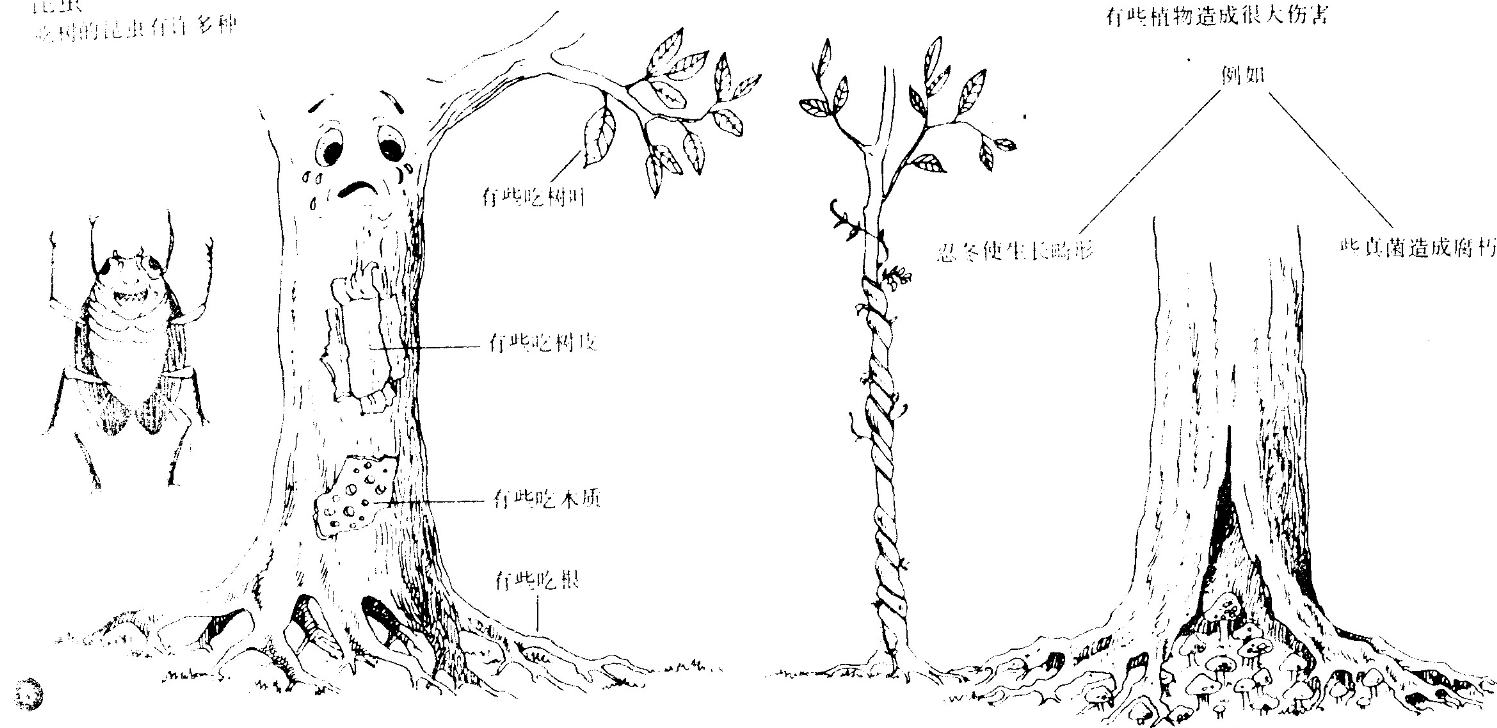
昆虫

吃树的昆虫有许多种

⑤

植物

有些植物造成很大伤害

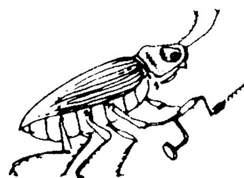


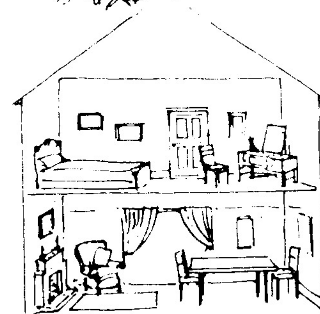
真菌和昆虫伤害我们家中的木材　例如

干腐菌



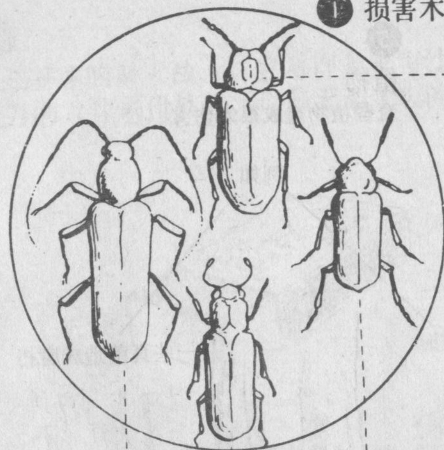
普通家具小蠹虫



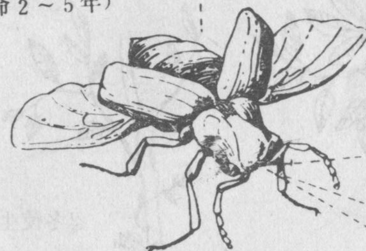


木 材 蛀 虫：1

❶ 损害木材的蛀虫有许多种

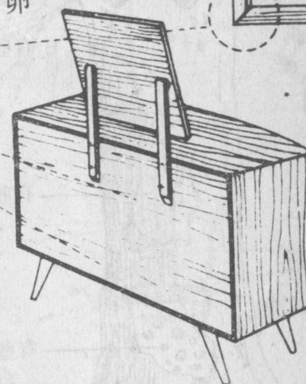


❷ 我们家中最常见的是普通家具小蠹虫



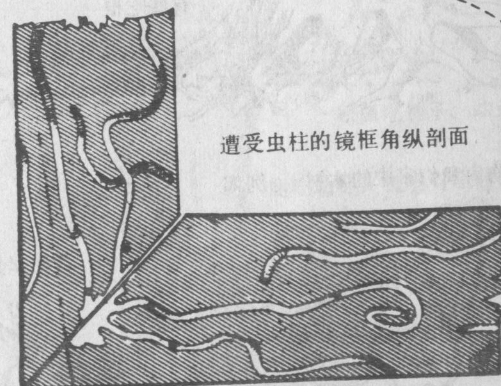
❸ 夏季，雌性小蠹虫在裂缝，裸露的木材表面，开裂的连接件处产卵





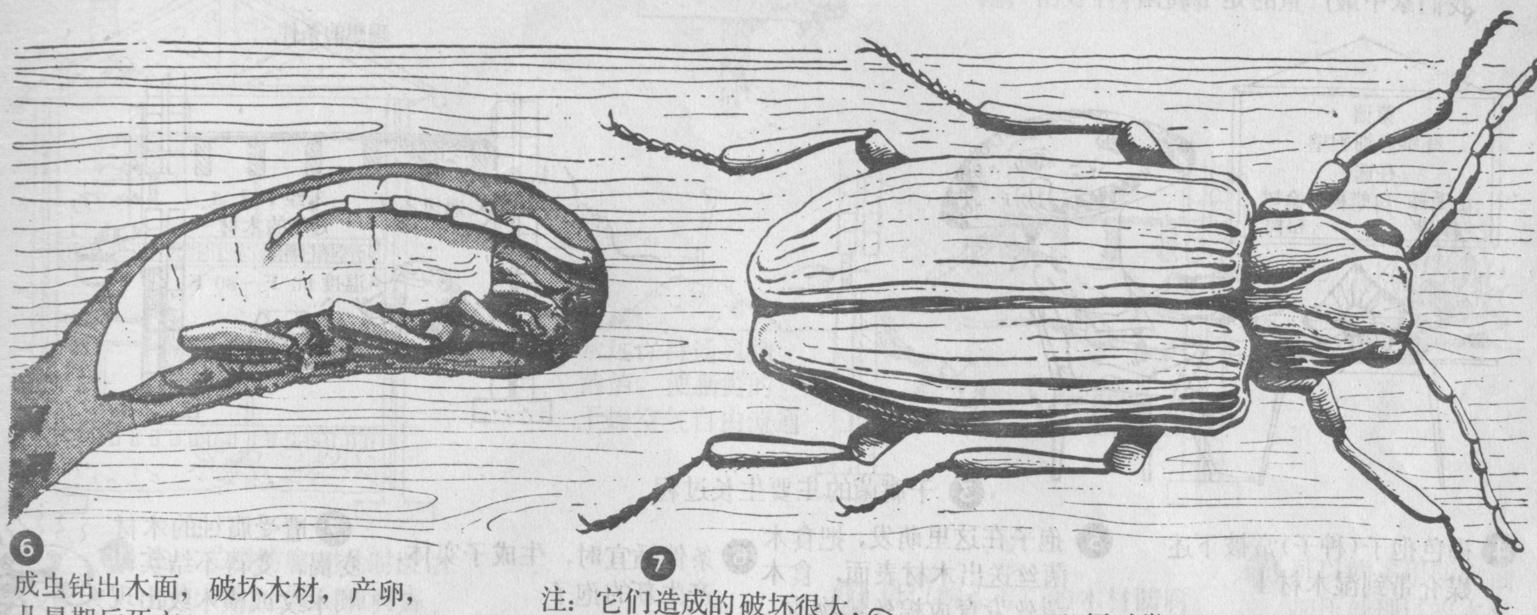
❹ 很短时间后孵出幼虫，幼虫钻木取食，破坏木材的强度（通称蛀木虫）



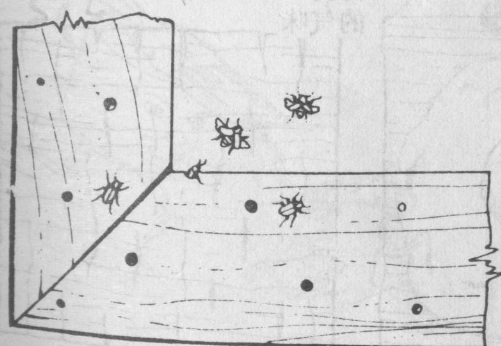


木材蛀虫：2

⑤ 数月后，幼虫钻到表面附近，在这里变成蛹，蛹长成成虫



⑥ 成虫钻出木面，破坏木材，产卵，几星期后死亡



⑦ 注：它们造成的破坏很大，一旦发现它们，必须请专业人员来消灭



必须时常喷洒杀虫液，锯除并焚毁被虫蛀坏的木材

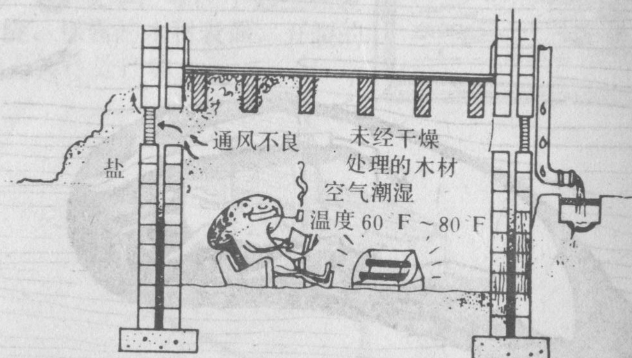


腐木菌:1

❶ 腐木菌有许多种
我们家中最严重的是干腐菌



❷ 要活，就必须有食物、水、氧气和适宜的温度



❸ 干腐菌的主要生长过程

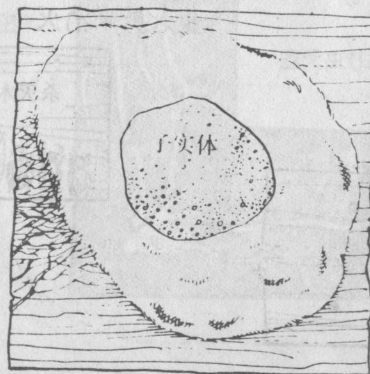
❹ 褐色孢子(种子)常被下述媒介带到湿木材上



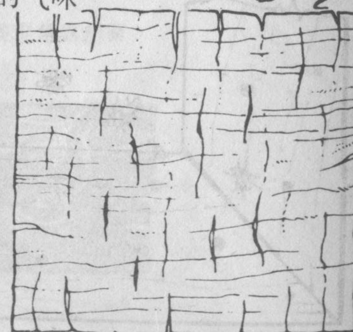
❺ 孢子在这里萌发，把食木菌丝送出木材表面，食木菌丝发育成棉丝状物质



❻ 条件适宜时，生成子实体，产生新的孢子

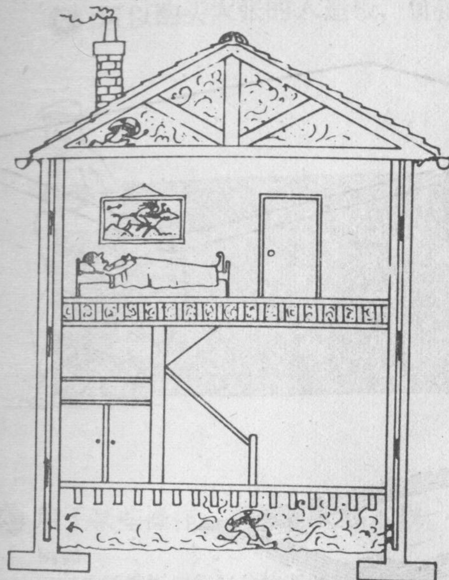


❼ 遭受腐蚀的木材变褐，变得不结实，顺木纹或横木纹出现脆裂，发出类似蘑菇的气味



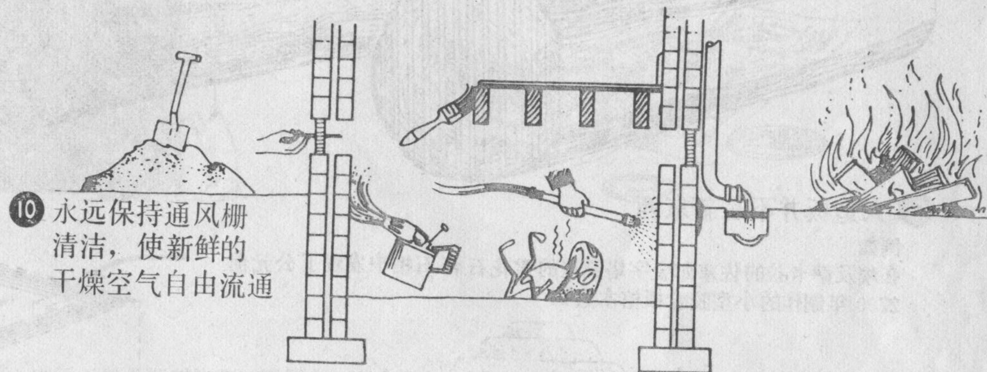
腐木菌：2

⑧它可能从地下室开始，扩展到橡木，使木材所有部分变形。因此，一旦出现这种情况，必须请专业人员来





⑨专业人员用热和有毒的真菌防腐剂来治理真菌，治好各种毛病

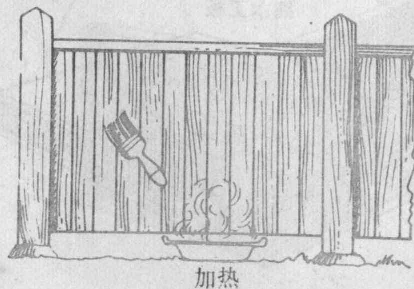


⑩永远保持通风栅清洁，使新鲜的干燥空气自由流通

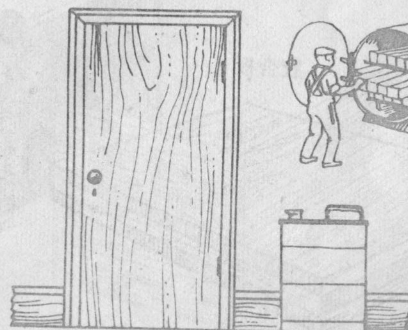
⑪注：采用防腐剂及时医治有助于阻止真菌的腐害



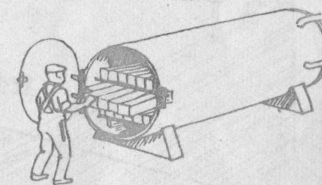
⑫杂酚油适合于粗加工，经常涂刷新涂层



⑬可以购买专门的木材防腐剂，为油漆或抛光涂饰打底

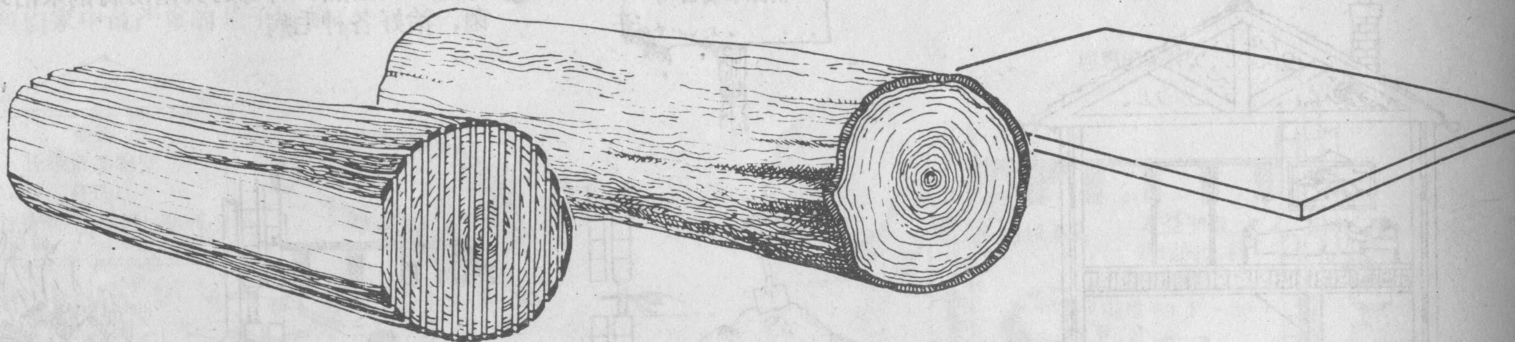


⑭可以购买用防腐剂加压处理过的木材



人造板入门:1

❶ 除天然木板外，还有多种用木材制成的平板状的人造板

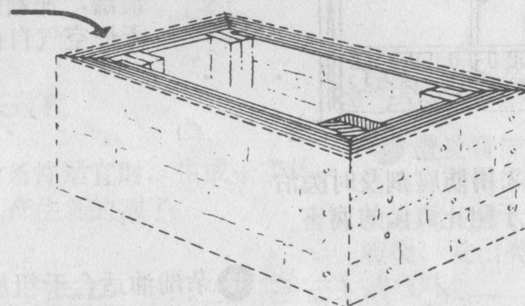


❷ 人造板并不是新东西

例如

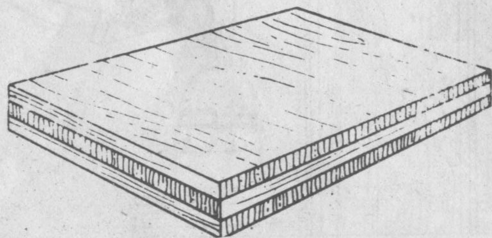
在埃及萨卡拉的佐塞尔金字塔通道的雪花石膏石棺中发现了公元前2700年制作的小型胶合板棺木遗物



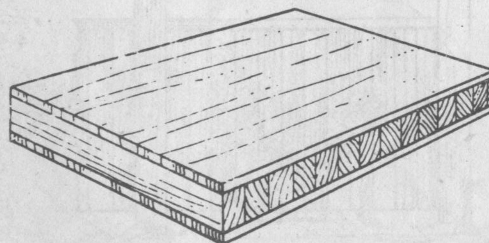


❸ 人造板实例

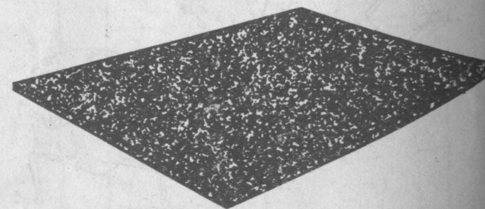
胶合板



细木工板

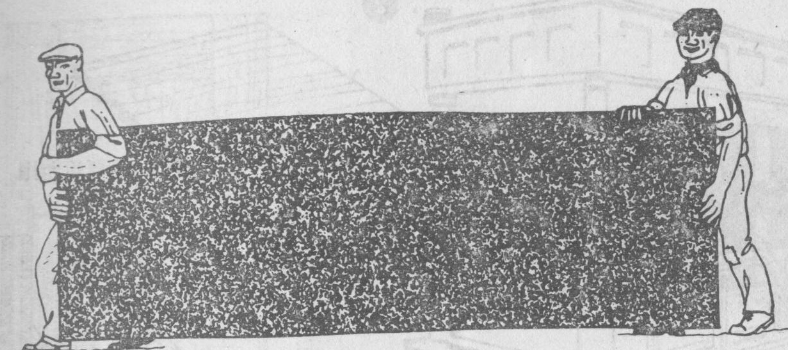


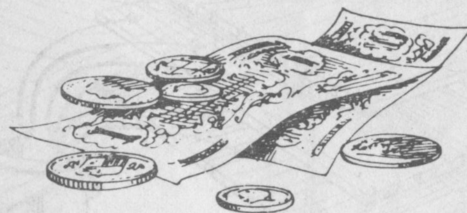
硬质纤维板



人造板入门：2

❹ 可以购买大张的人造板，价钱公道

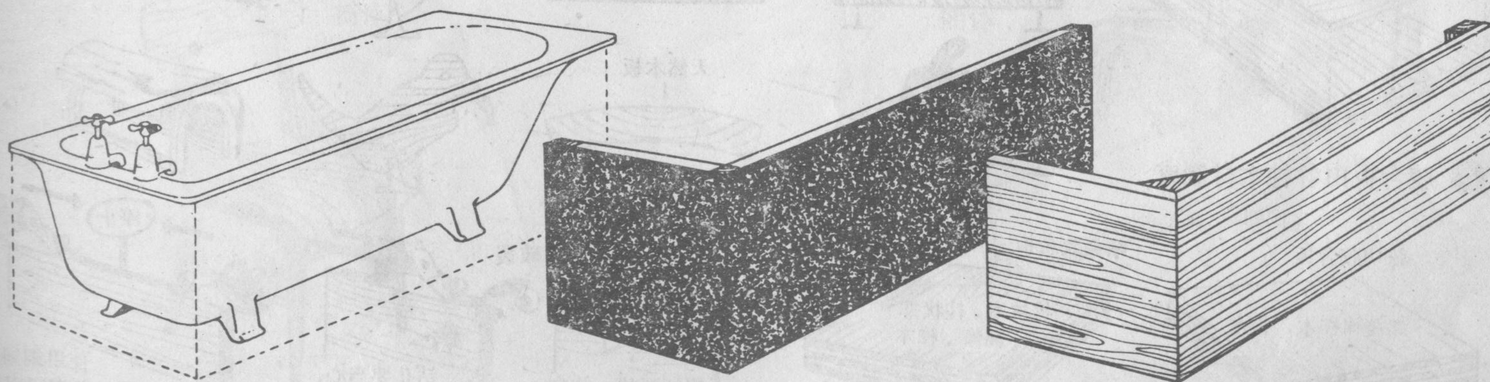




❺ 用于某些操作，要胜过天然木板

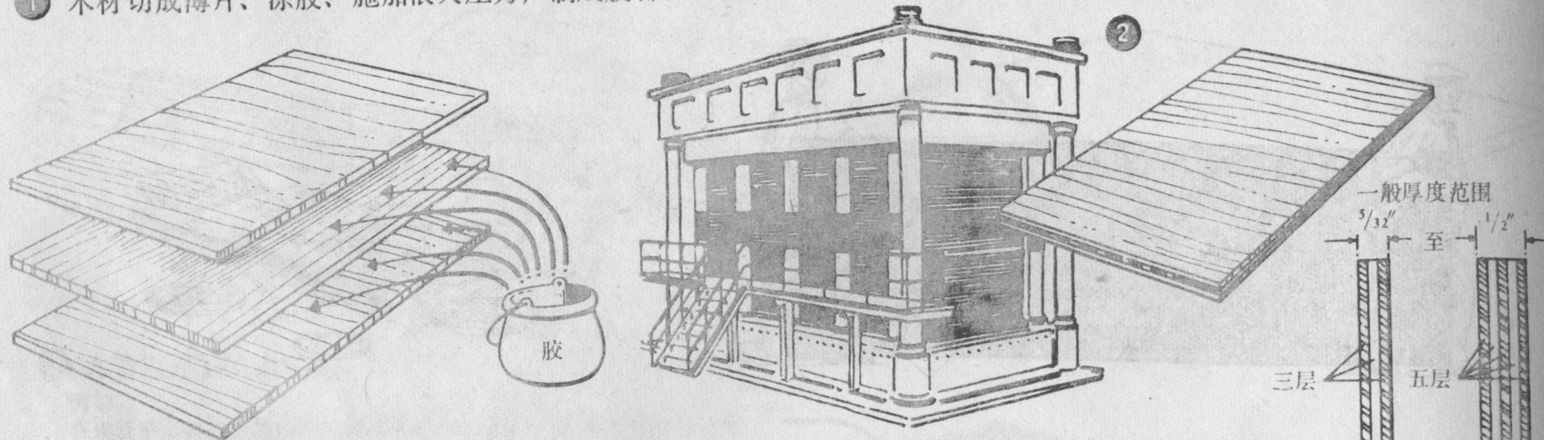
例如

用硬质纤维板制作浴盆的四壁，固定在轻型框架上，比用天然木板制作四壁更便宜，更合适



胶 合 板：1

❶ 木材切成薄片、涂胶、施加很大压力，制成胶合板



❸ 涂胶的各层薄片木纹交叉放置，以保证胶合板的强度和稳定性，使难处理的外形(不易加工的端面纹理）能够加工，薄的胶合板可用手工围着构架弯曲而不开裂



❹ 胶合板由各种木材制成

例如

弦切胶合板

加蓬楝桦木，松木

贴面胶合板

核桃木、柱状非洲楝、橡木

内层多为弦切板

❺ 注：锯、刨、钻孔要当心

注意破裂

锯切要慢，放在结实的基础上

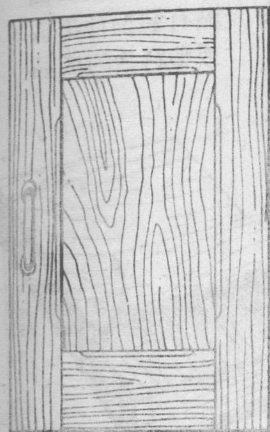
钻孔要当心，从两面钻

停止

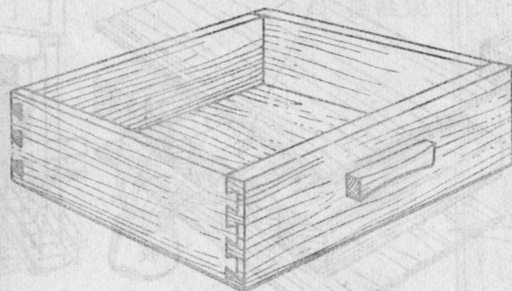
使用细刨子时要从两端向中心刨

胶 合 板: 2
用 途 实 例

壁板



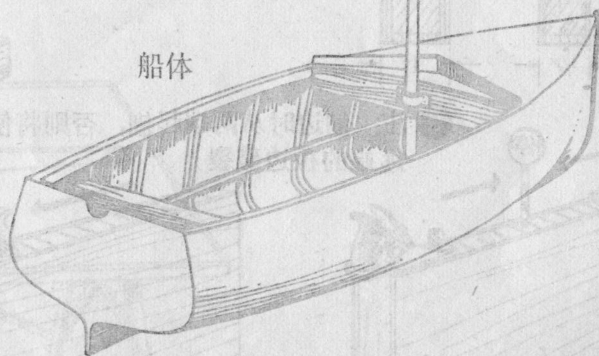
抽屉底



椅座

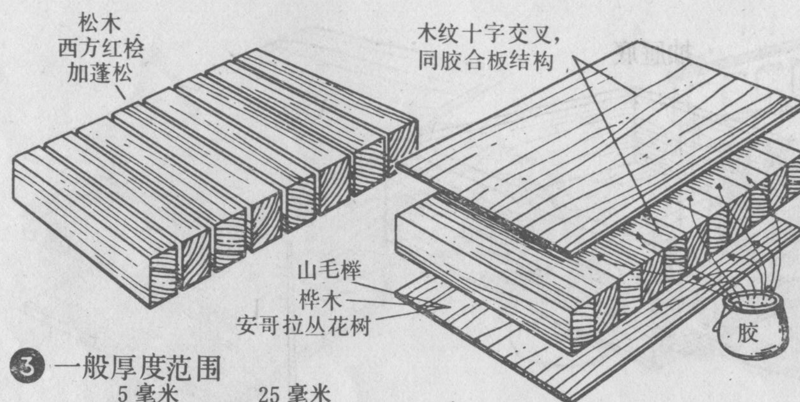


船体



细 木 工 板: 1
细木工板入门

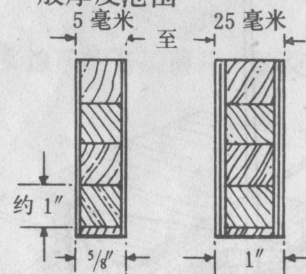
❶ 木材切割成板条，表面铺以薄片，涂胶，施加很大压力，制成细木工板



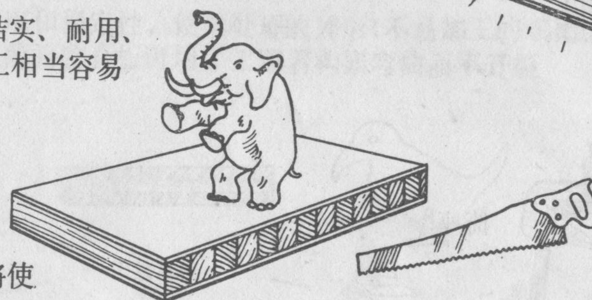
❷ 可以购买表面贴有装饰性单板或塑料板的成品



❸ 一般厚度范围



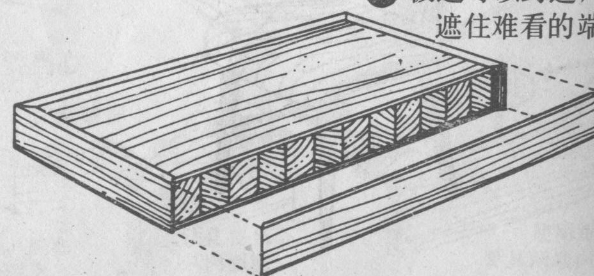
❹ 细木工板结实、耐用、稳定，加工相当容易



❺ 注：刨边时从两端起刨，否则将使远端的板边破裂

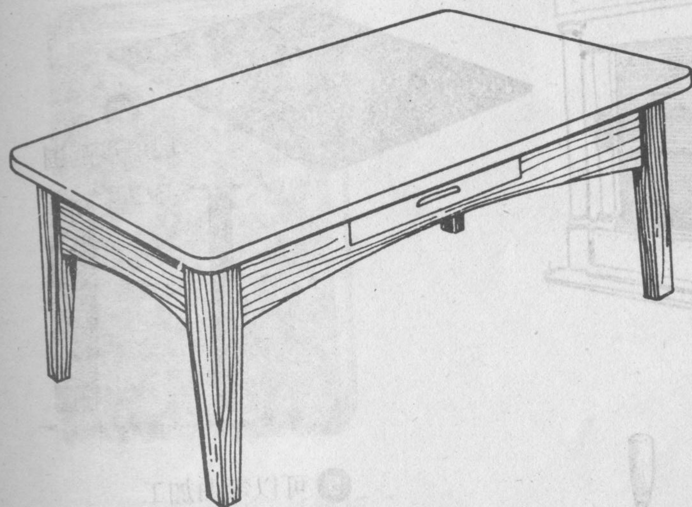


❻ 板边可以封边，以遮住难看的端面木纹

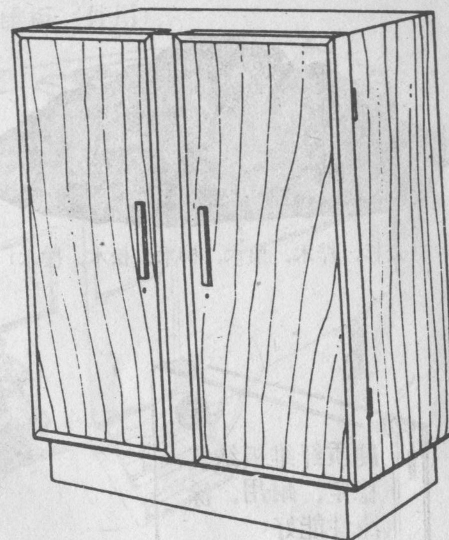


细 木 工 板:2
用 途 实 例

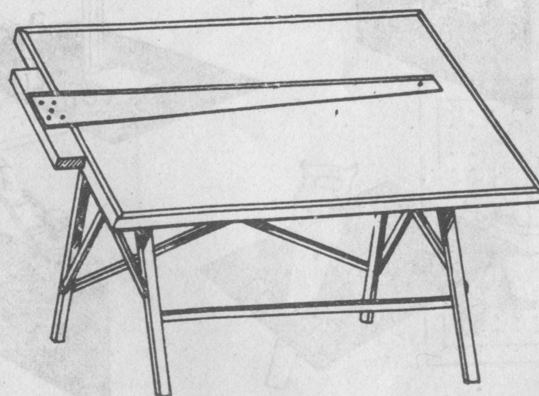
桌面



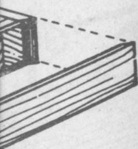
门、箱框架



绘图板



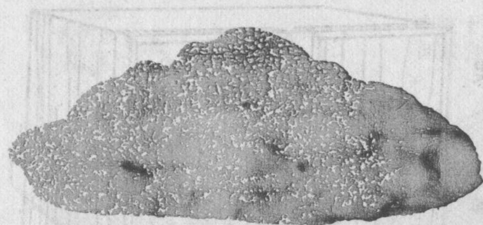




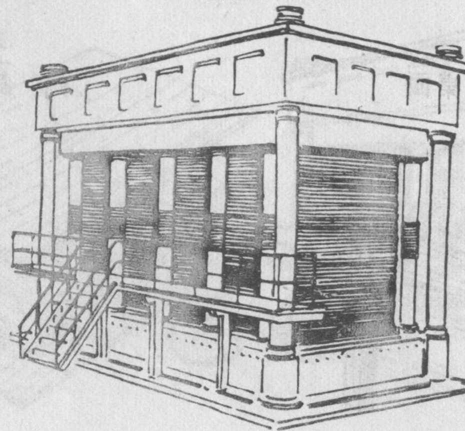
硬质纤维板:1

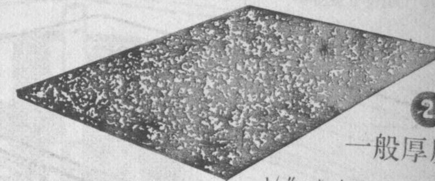
硬质纤维板入门

❶ 木材破碎成纤维状，使用化学物品，在热和很大压力下，制成硬质纤维板



（云杉、桦木、栗木、柳木、松木、桉木）





❷ 一般厚度范围

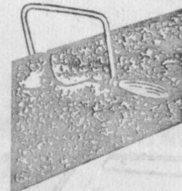
$^1/_8$″ 至 $^5/_{16}$″

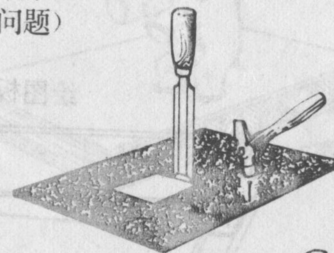
3 毫米 8 毫米

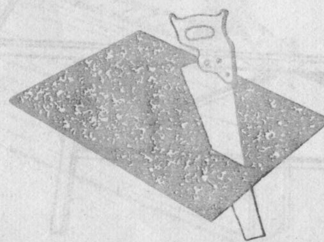
❸ 硬质纤维板结实、稳定、耐用、涂漆性能好

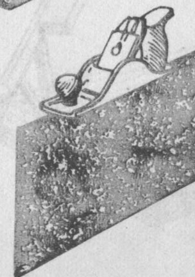


❹ 加工相当容易（没有木纹问题）



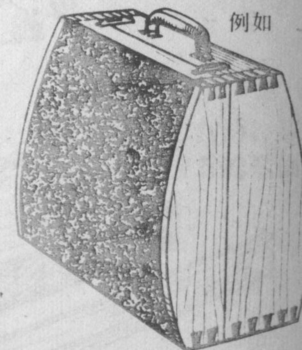






❺ 可以弯曲加工

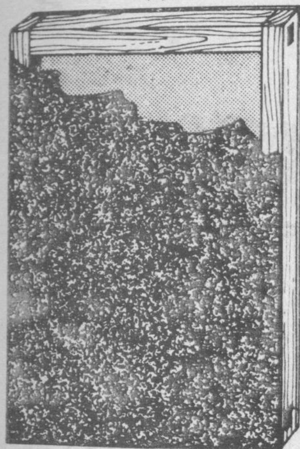
例如



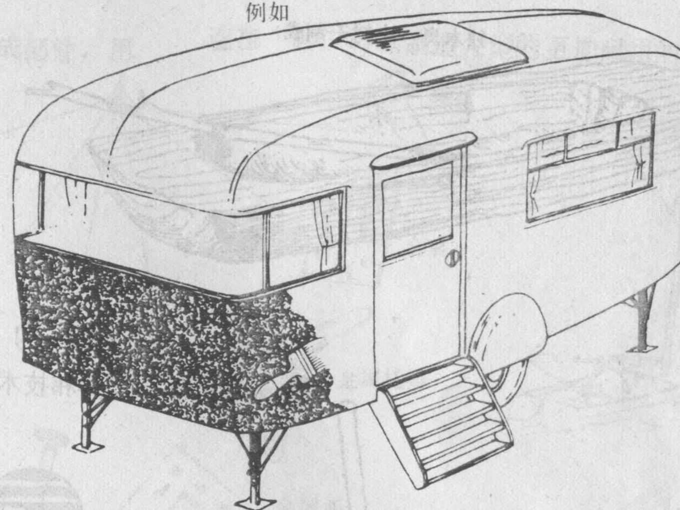
硬质纤维板：2

四种硬质纤维板及其用途

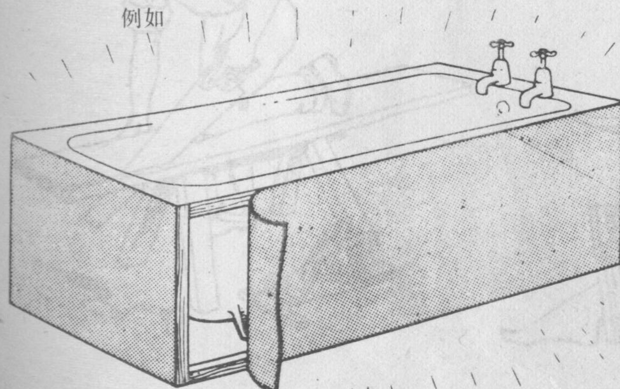
标准硬质纤维板
(用于一般表面施工)
例如



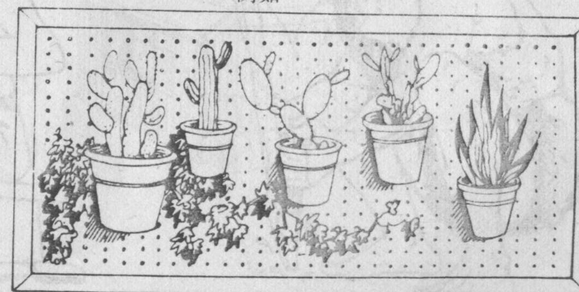
涂油硬质纤维板（外用）
例如



塑料贴面硬质纤维板
(用于浴室及厨房施工)
例如



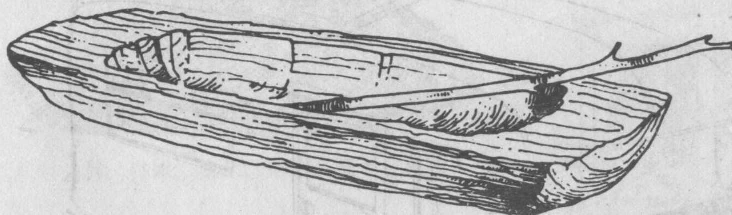
孔眼硬质纤维板
(用于室内装饰及陈列板)
例如



结 构 入 门: 1

❶ 木材结构最初可能有两种

独木舟（由树干制成）



用草系成的树枝掩体

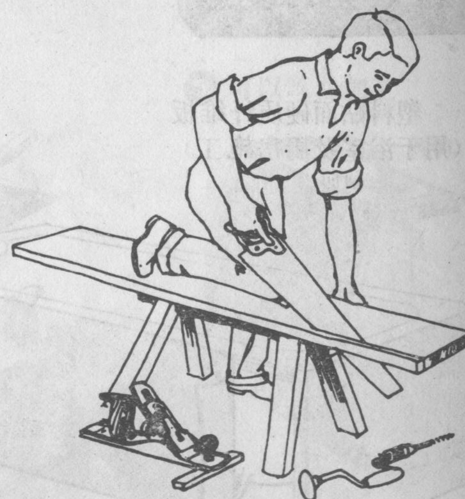


结 构 手 艺

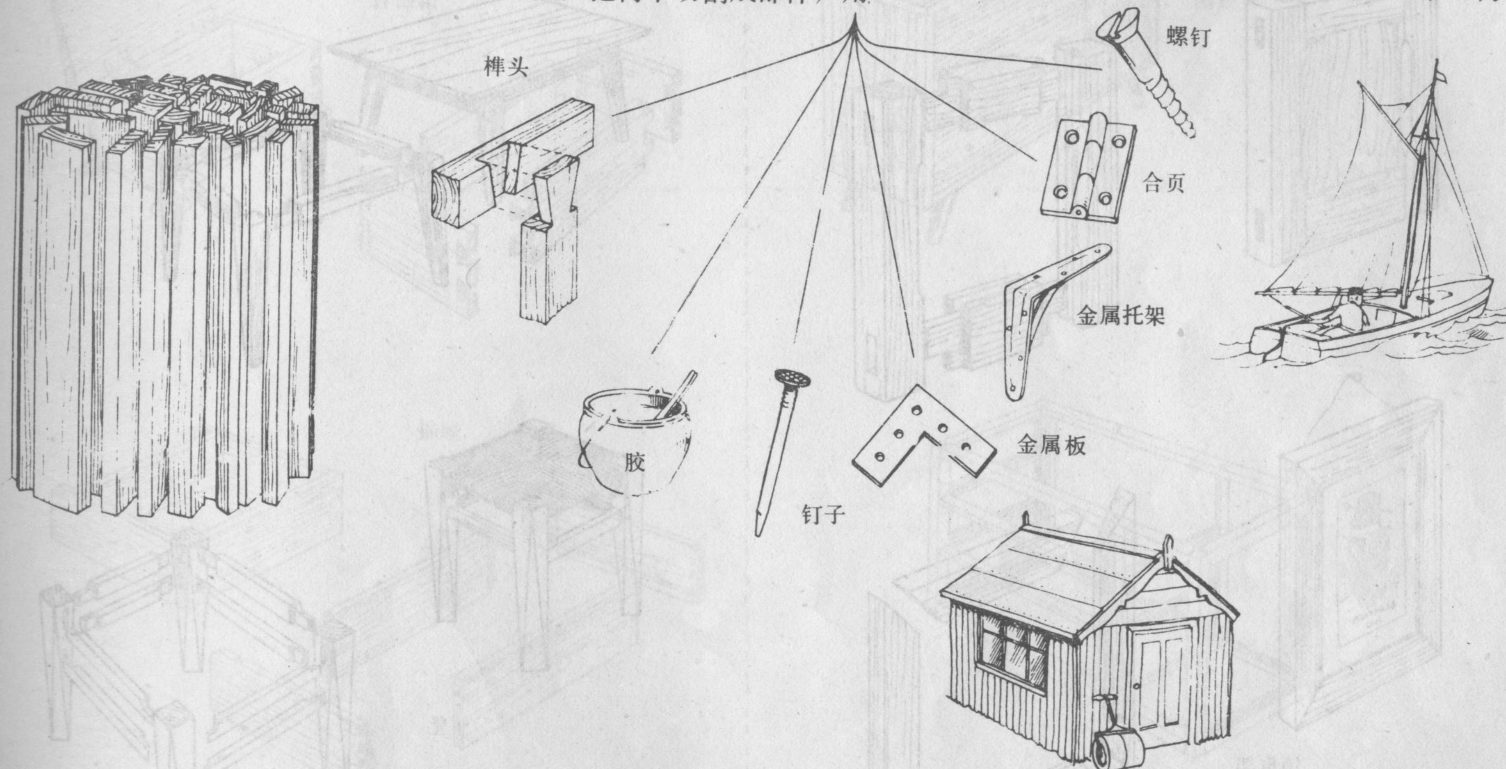
❷ 人类进展，工具和技术随之改进







③ 人们发现，把树干切割成部件，用连在一起，可以制造大型的更加耐用的木结构

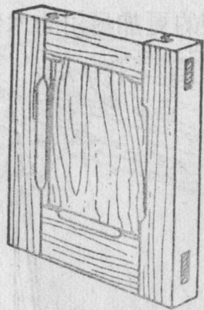


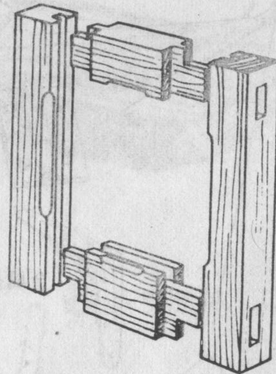
主要结构形式：1

平框架结构

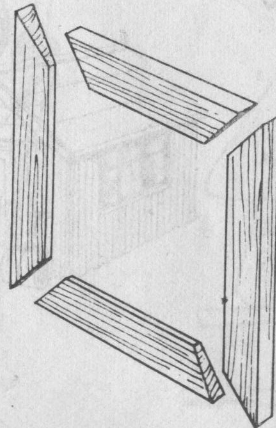
例如

门







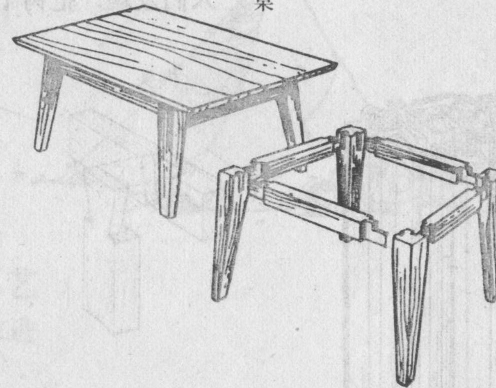


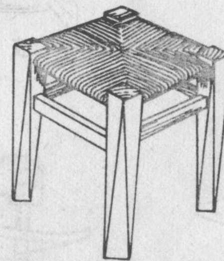
镜框架

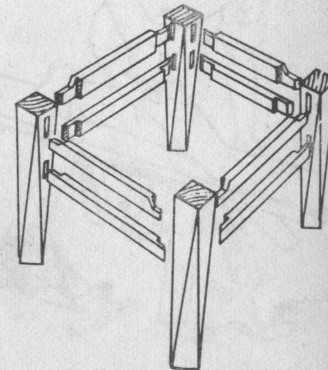
腿架结构

例如

桌







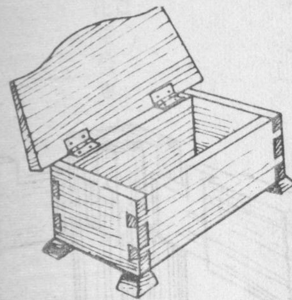
凳

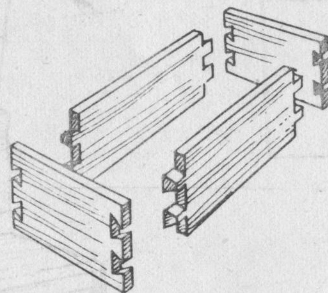
主要结构形式:2

箱体结构

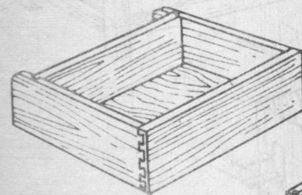
例如

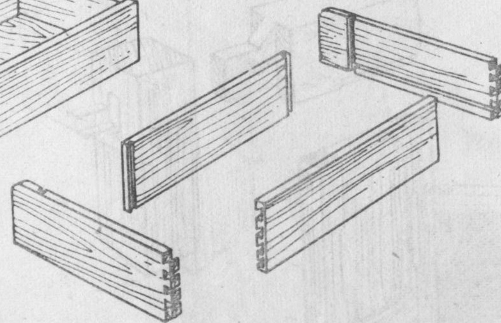
首饰箱





抽屉

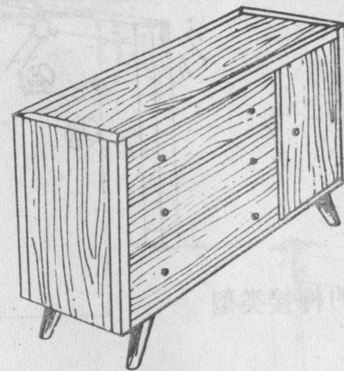


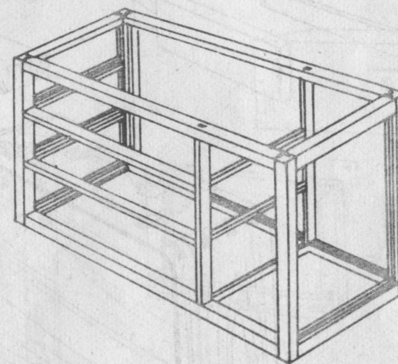


框架结构（组合框架常配以木板）

例如

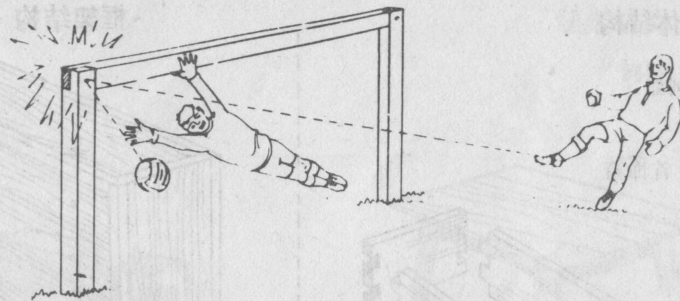
橱柜



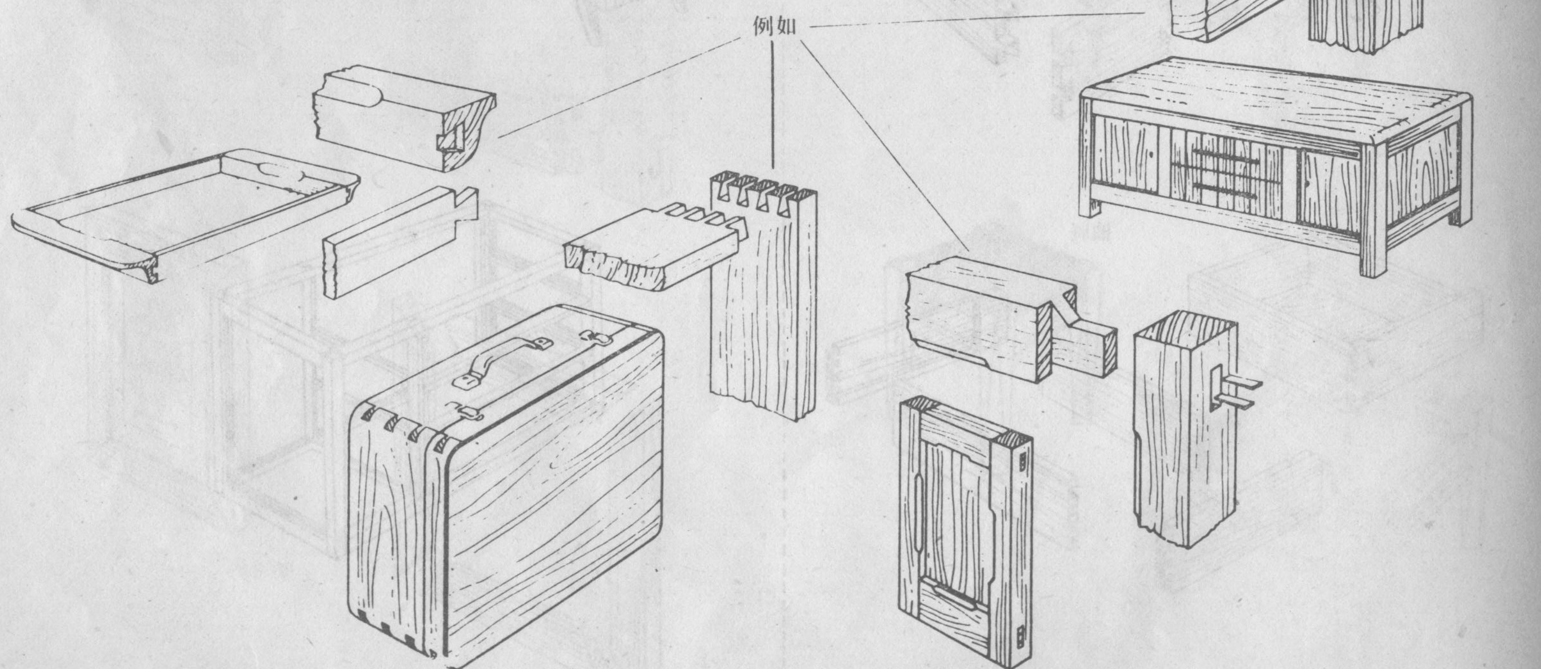


榫接入门:1

❶ 榫接是木结构的自身紧固方式

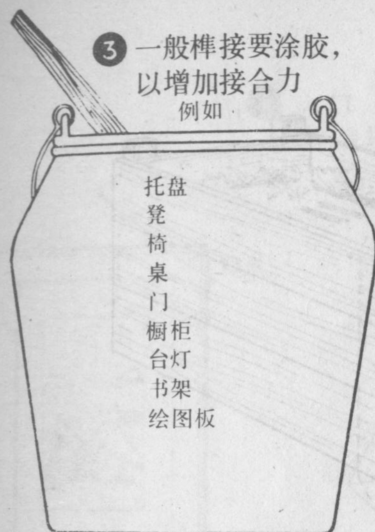


❷ 不同的结构要求不同的榫接类型

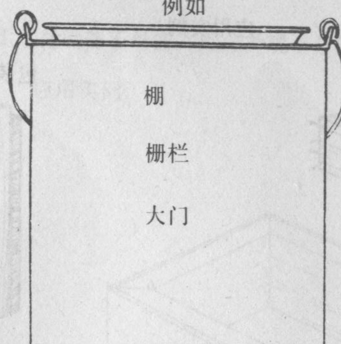


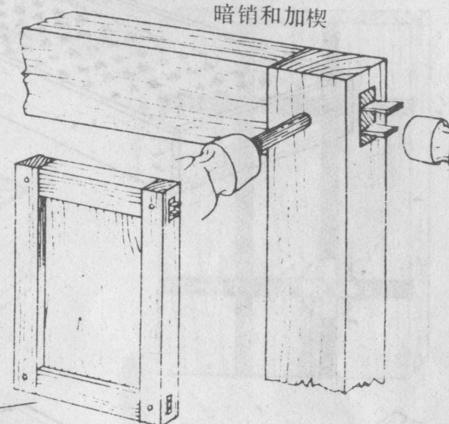
榫接入门：2

❸ 一般榫接要涂胶，以增加接合力

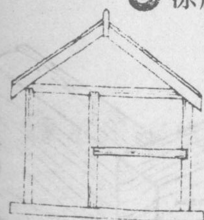


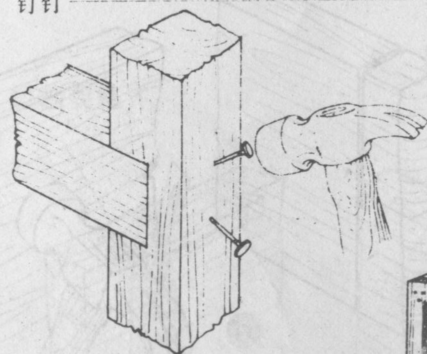
❹ 某些室外榫接要涂漆或防腐油，使其耐候

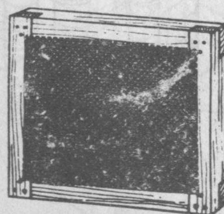


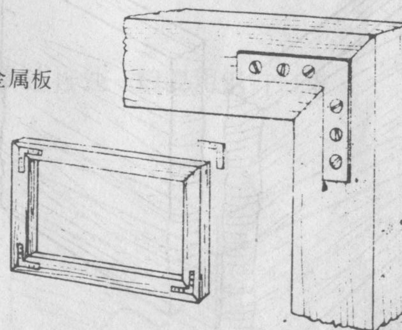


❺ 涂胶、防腐油或涂漆以增加强度和接合力以后，榫接有时要







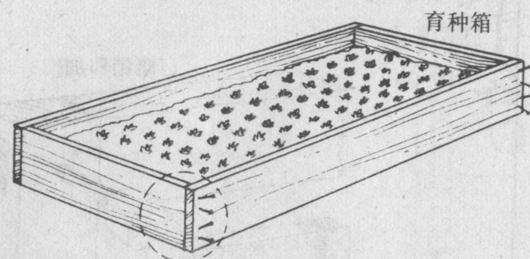


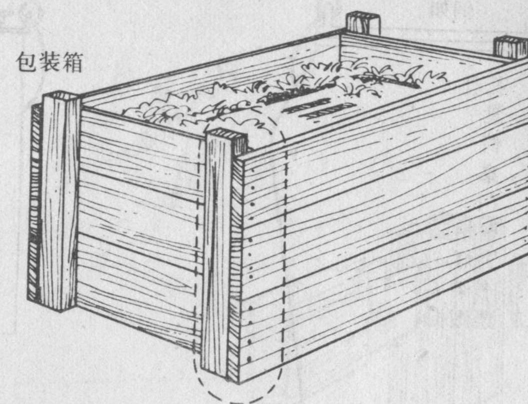
对 接

入门

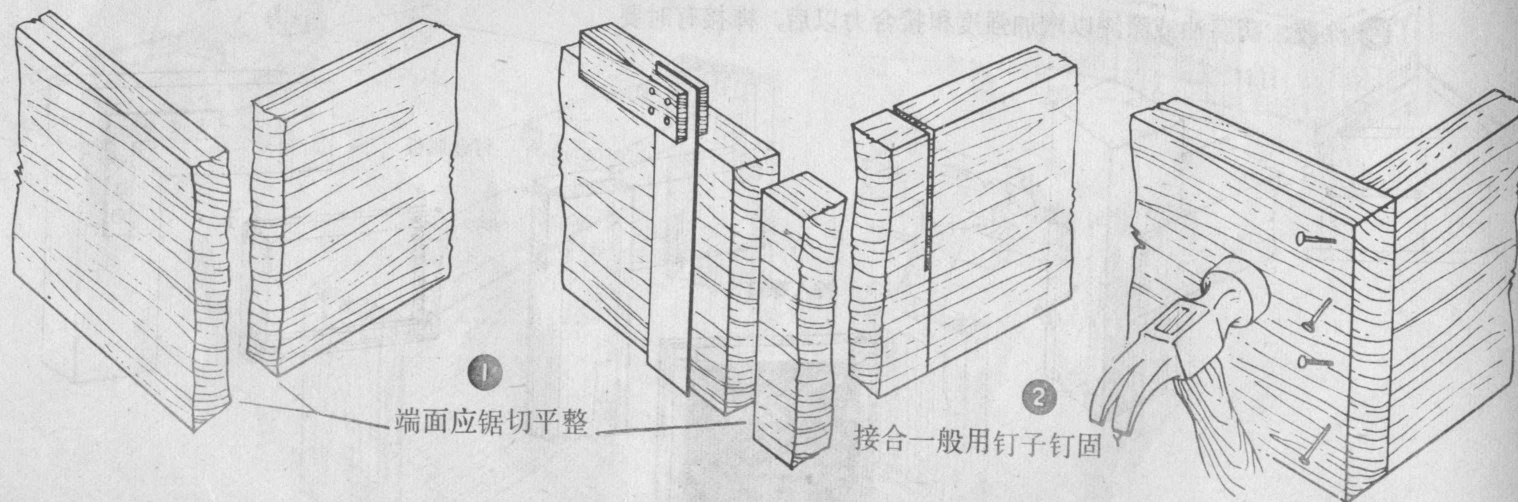
对接是所有榫接中最简单的一种，一般用于粗加工

应用实例





基本连接详图

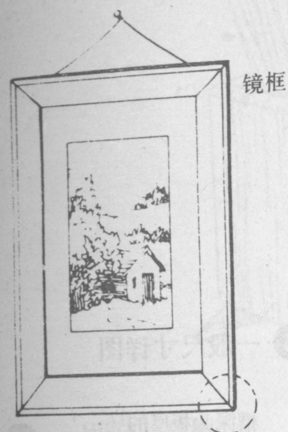


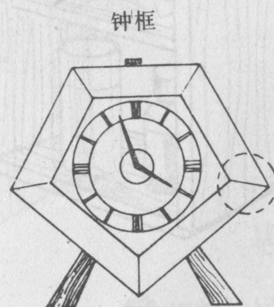
斜 接

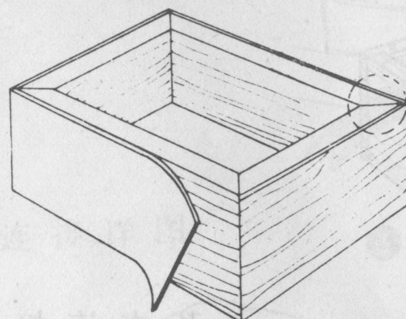
❶ 入门

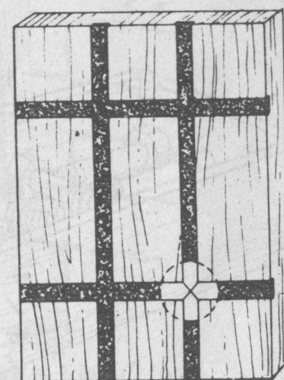
斜接主要用于轻型框架，由于木材端部不外露，因此外观十分整洁

应用实例



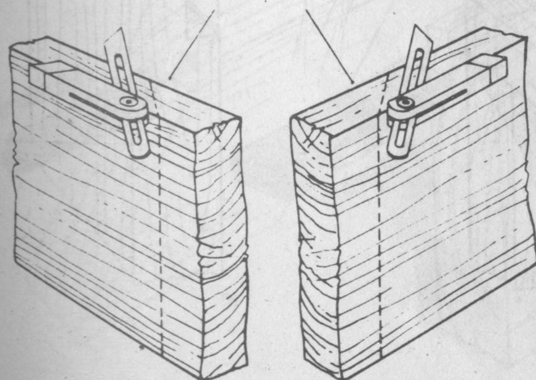




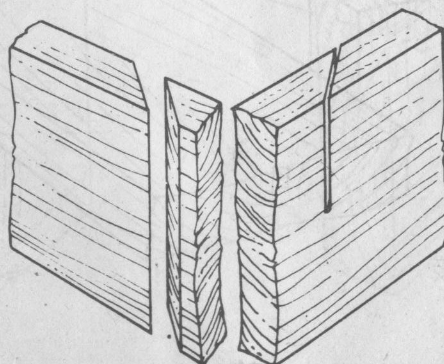


基本连接详图

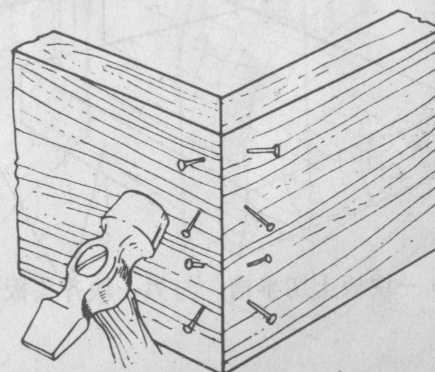
❷ 端面应标线，切割要整齐



❸



❹ 连接处一般要用钢钉钉牢



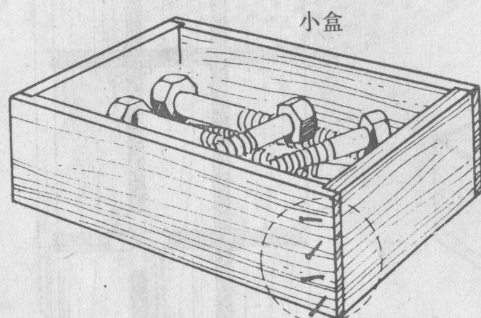
搭　接

入门

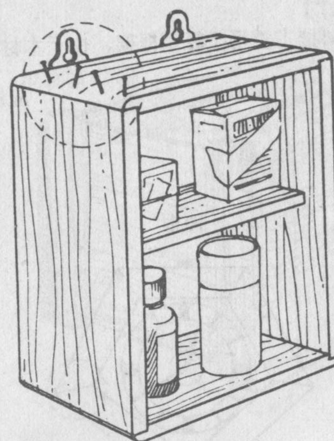
搭接不大牢固，主要用于次要木工作业

应用实例

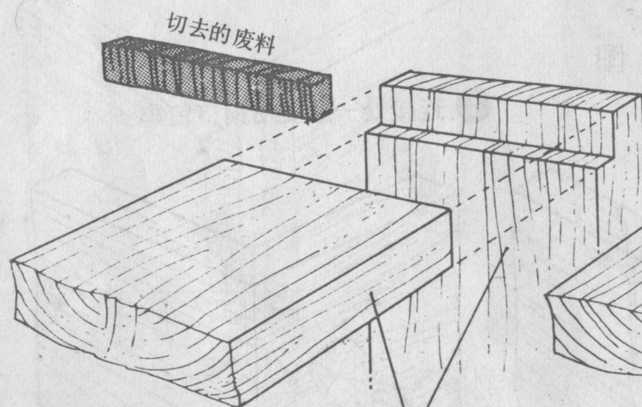
小盒



壁架



基本连接详图

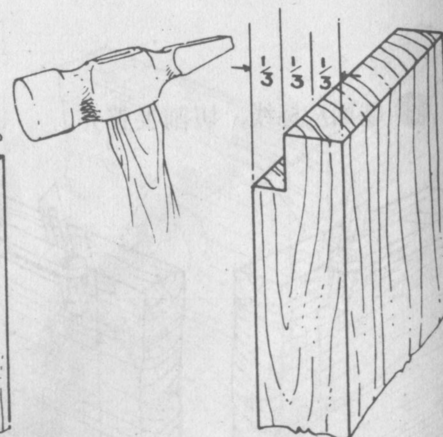


❶ 一块板上切半槽，与另一块齐头板嵌接

❷ 连接处一般用销钉或钢钉钉牢

❸ 一般尺寸详图

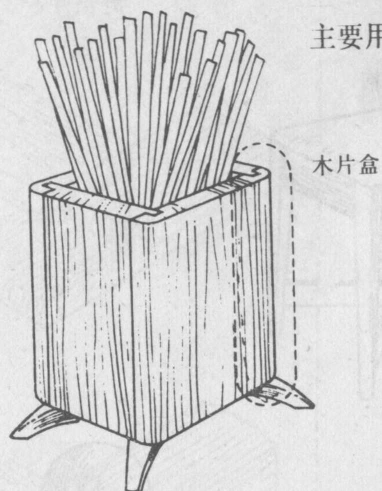
槽深为板厚的$^1/_3$

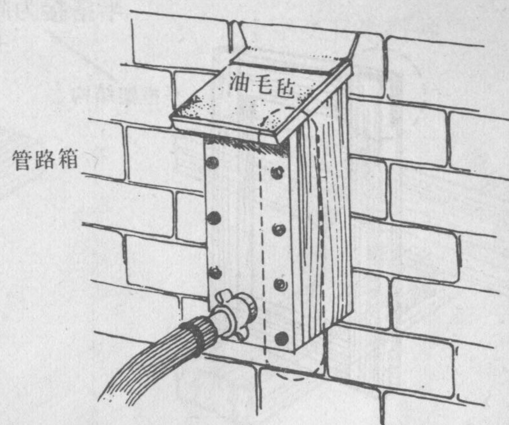


榫舌和榫槽对接

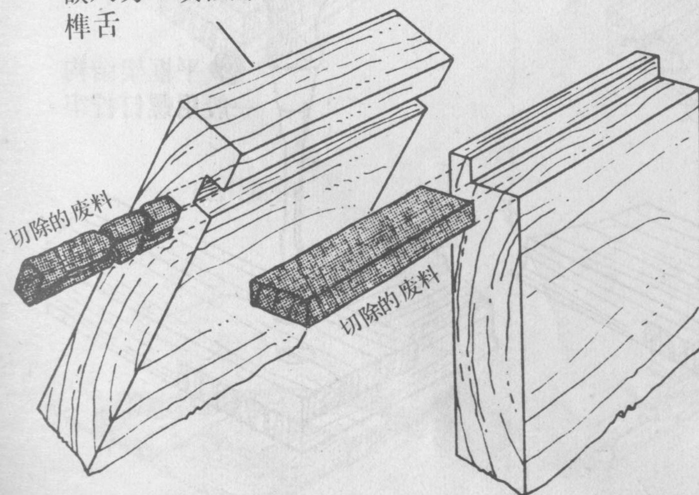
主要用于箱盒结构

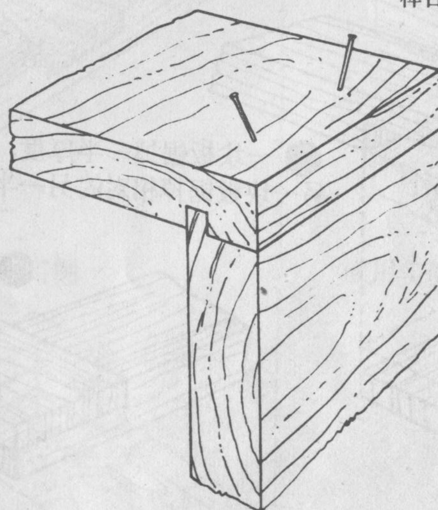
应用实例

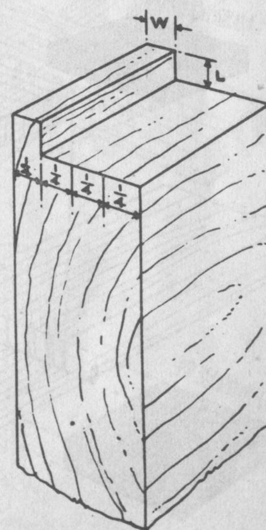




基本连接详图





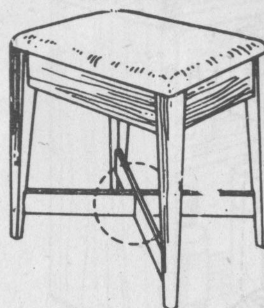


半搭接入门

半搭接为简单的轻框架连接
主要用于

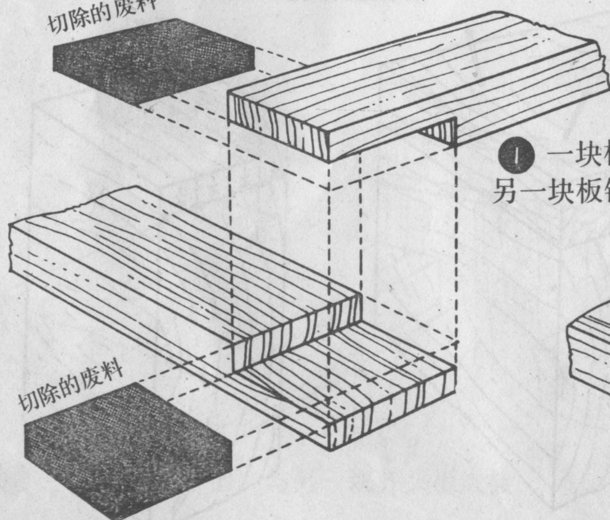


平框架结构

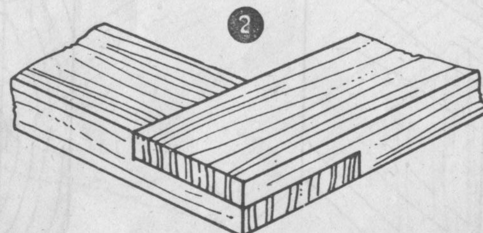


腿与横撑结构

基本连接详图



❶ 一块板锯掉一半厚度，
另一块板锯掉相对的另一半厚度



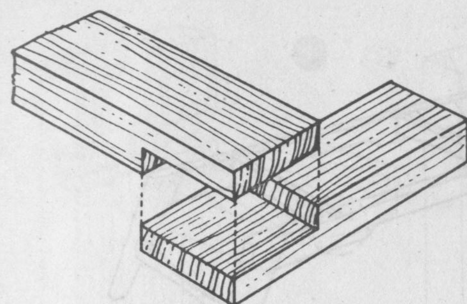
❷

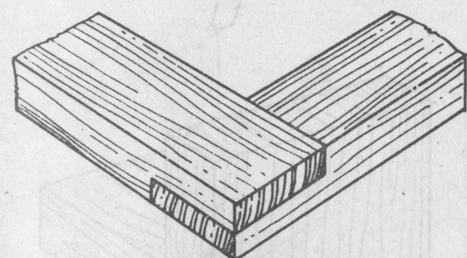


❸ 平框架结构
一般用螺钉拧牢

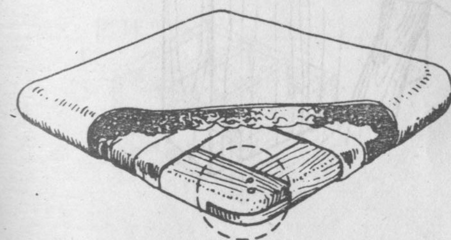
主要的半搭接

直角半搭接

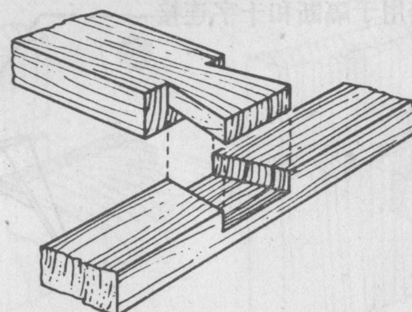


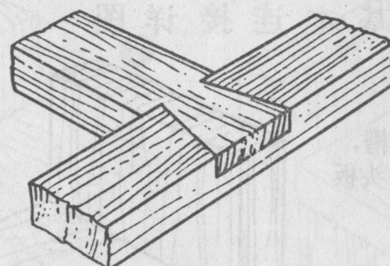


应用实例

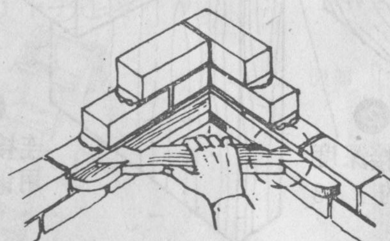


燕尾半搭接

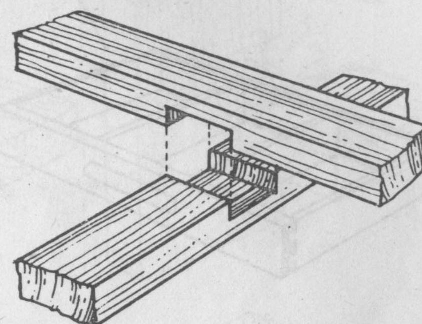


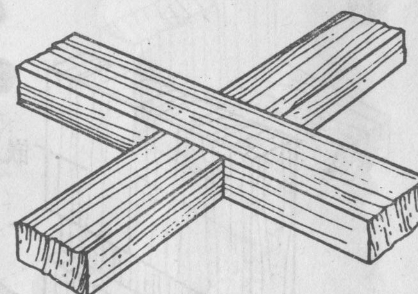


应用实例

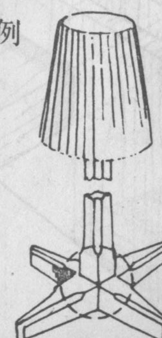


十字交叉半搭接

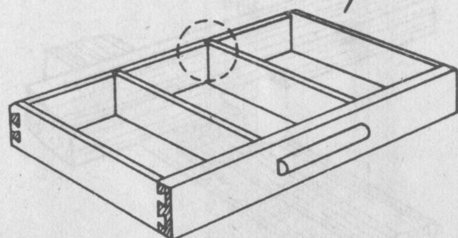
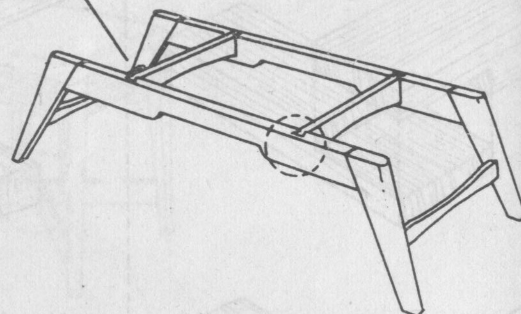




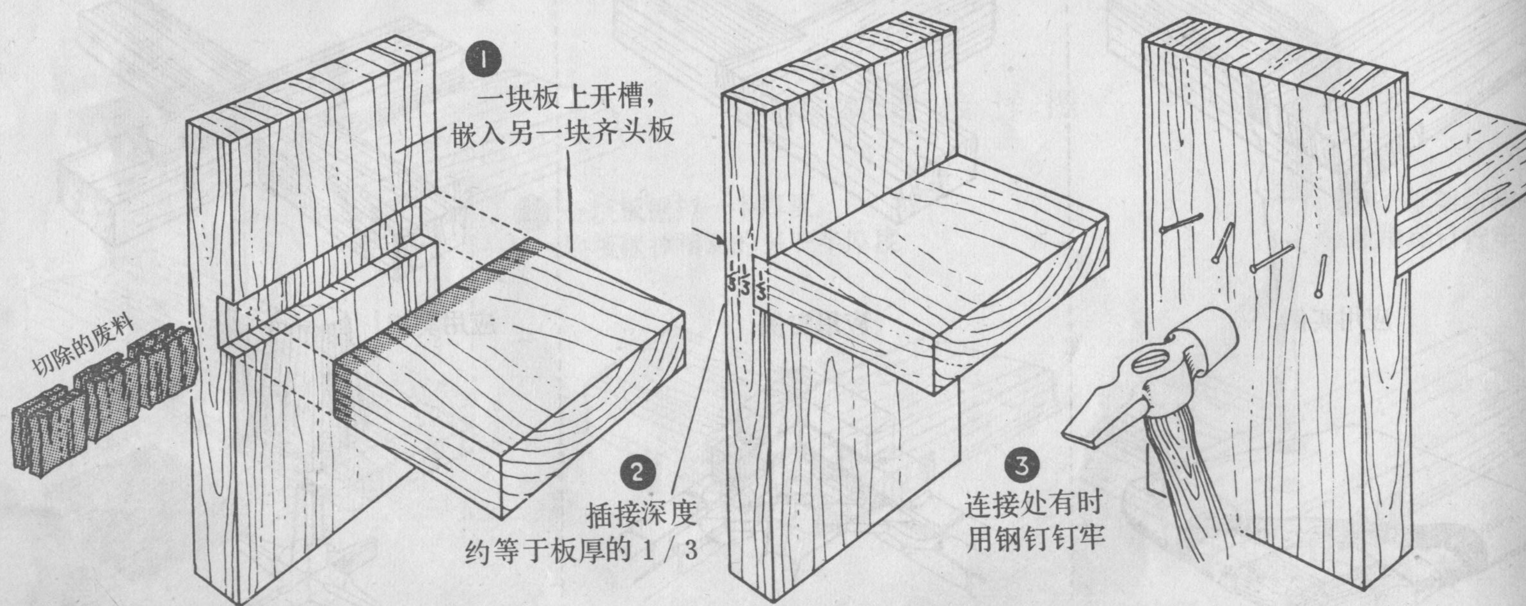
应用实例



插 接

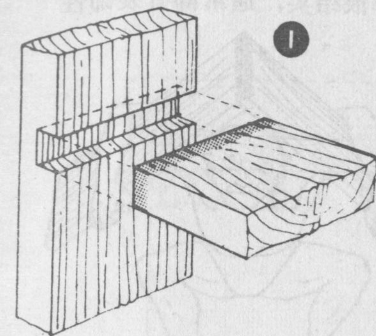


插接用于隔断和十字连接

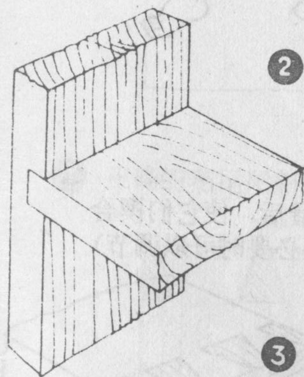
基本连接详图


1
一块板上开槽，
嵌入另一块齐头板
切除的废料
2
插接深度
约等于板厚的 1/3
3
连接处有时
用钢钉钉牢

主 要 插 接 型 式

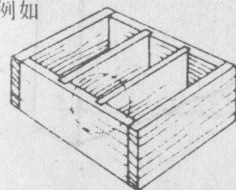
透插接



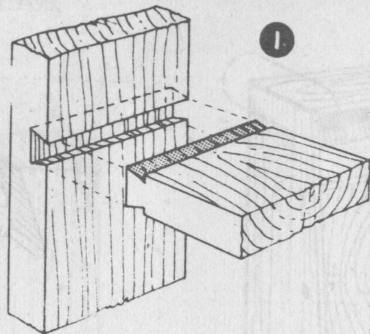


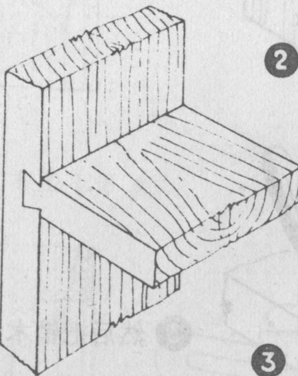
3 用于粗隔断作业

例如



透燕尾插接



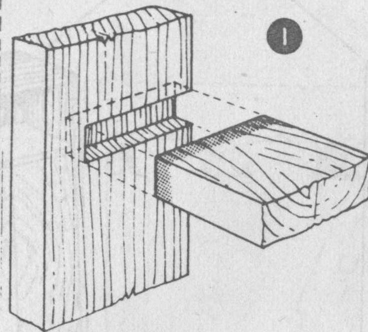


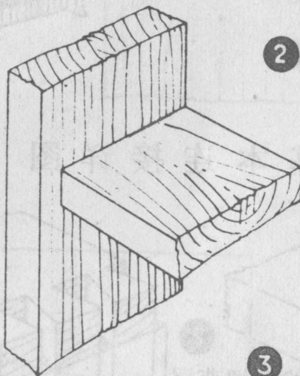
3 用于十字连接

例如



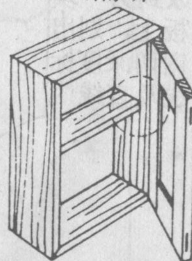
半透插接



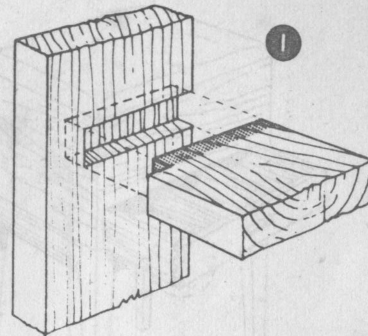


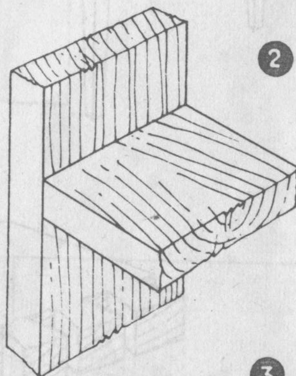
3 用于埋头隔断

例如



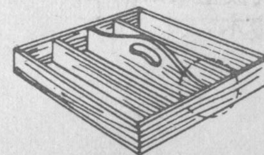
半透减榫插接





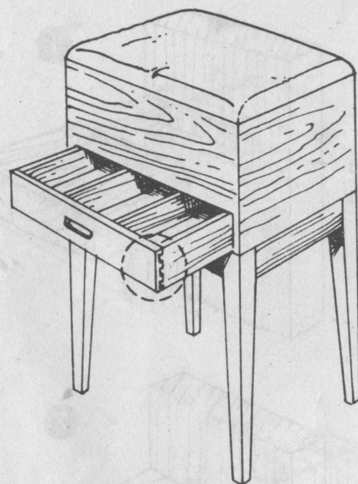
3 用于普通的隔断

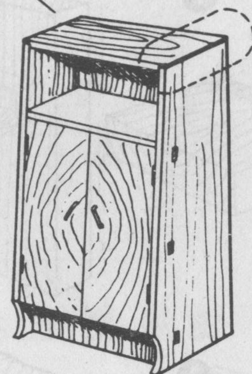
例如



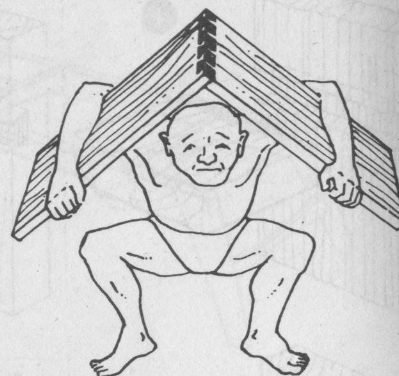
燕尾榫入门

燕尾榫主要用于高级箱盒和橱柜结构

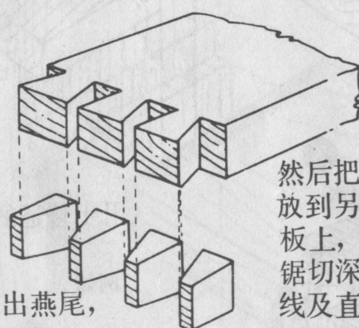




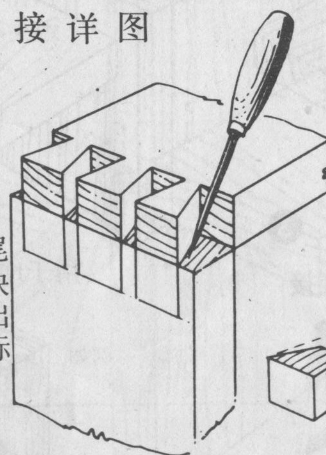
燕尾榫很结实，通常都有装饰性



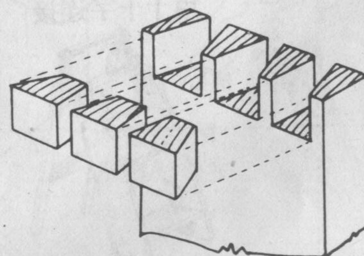
基本连接详图



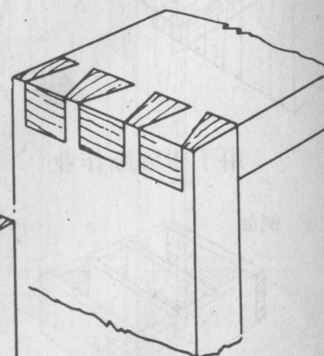
❶ 在一块板上划出燕尾，锯掉废木



❷ 然后把燕尾放到另一块板上，划出锯切深度标线及直线



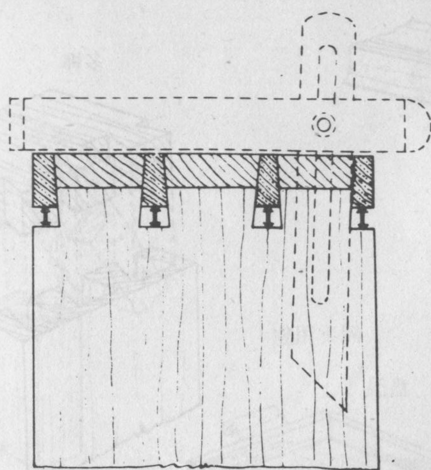
❸ 然后把销木锯掉



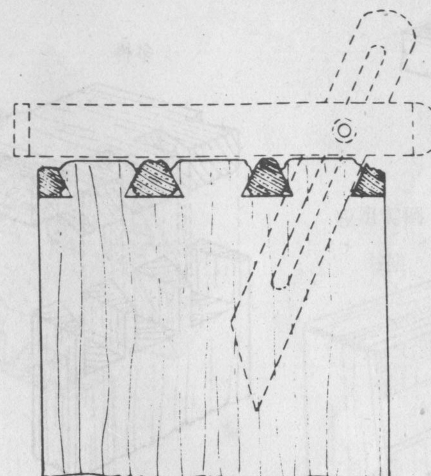
❹ 最后，使它们楔合（必要时可以调节）

燕尾斜度详图

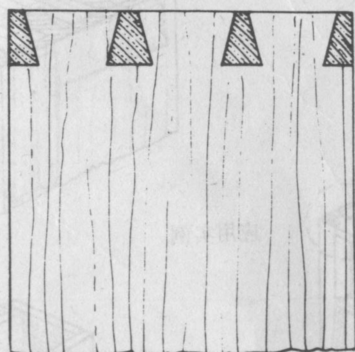
❺ 如果斜度过陡，则握力较小

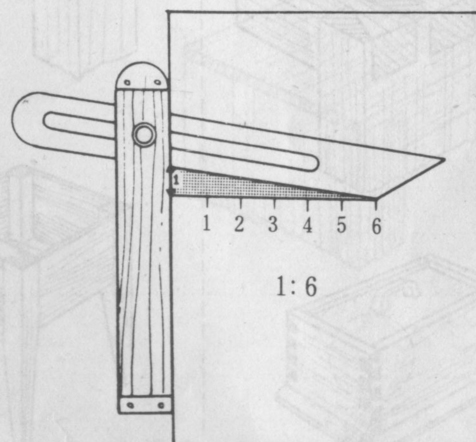


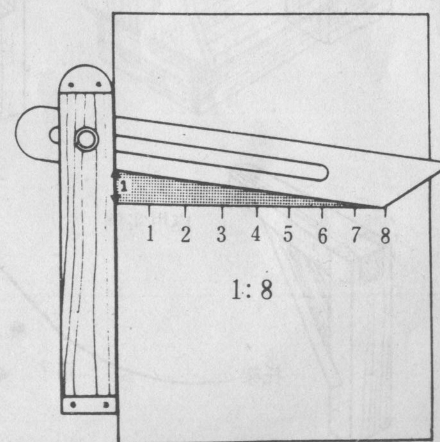
❻ 如果斜度过缓，则榫接不牢，可能损坏燕尾



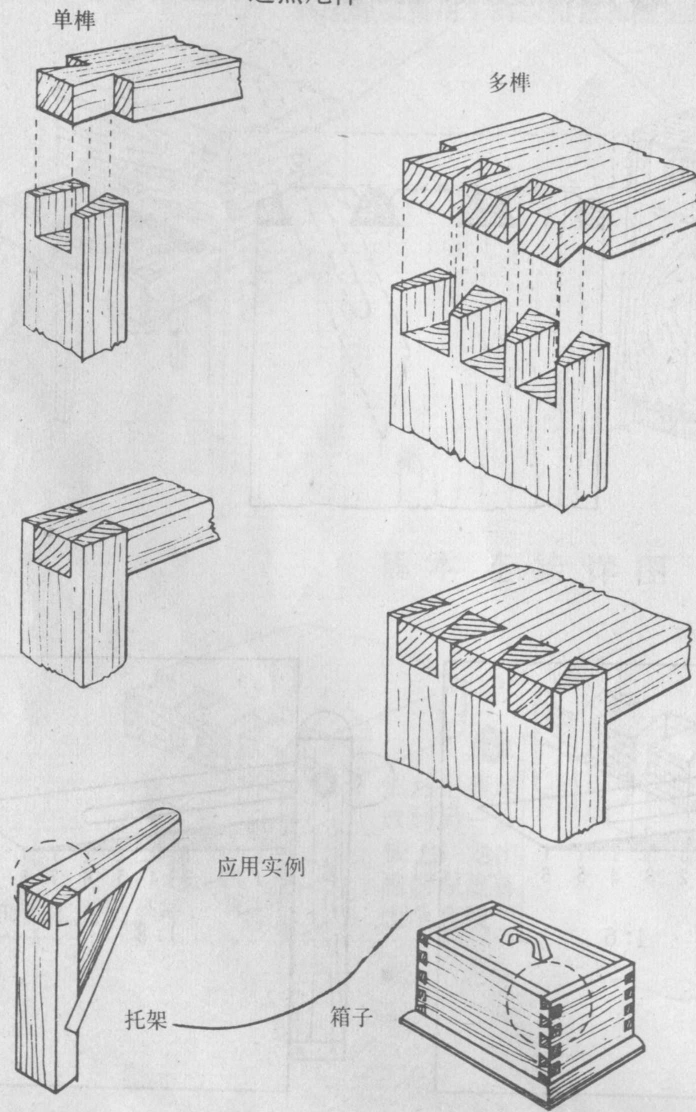
❼ 正确的燕尾屋斜度是 1: 6 至 1: 8

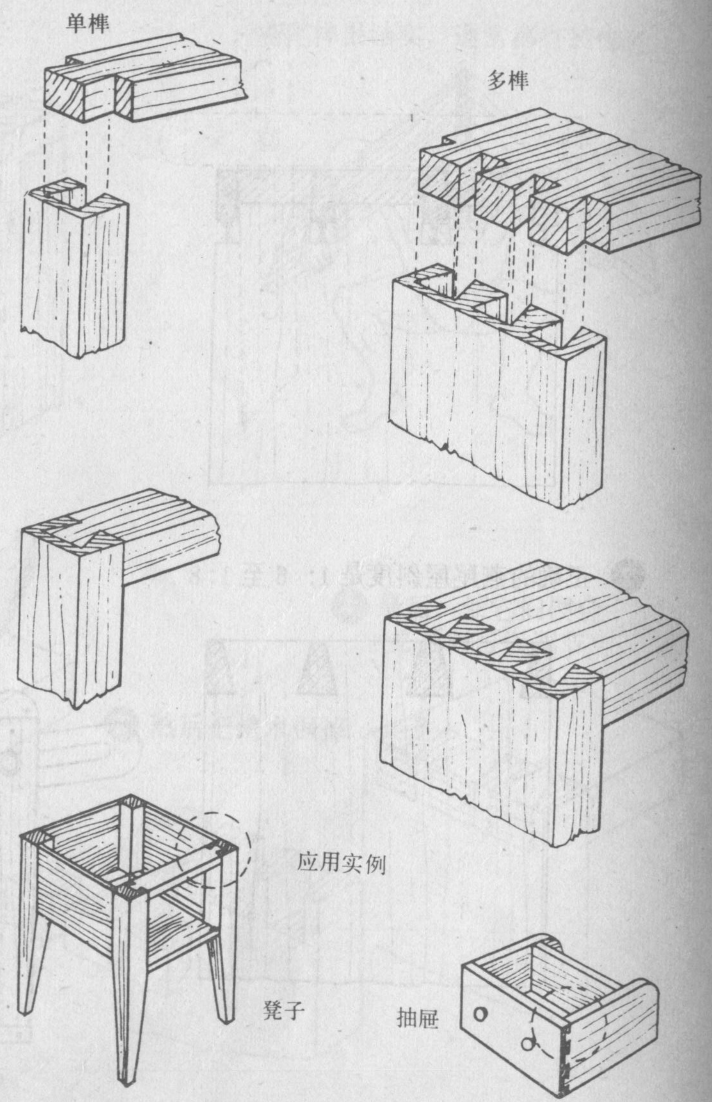






主要燕尾榫：1

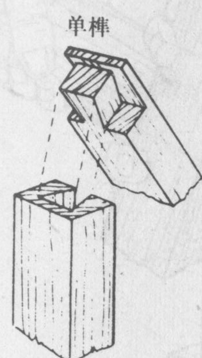




主要燕尾榫：2

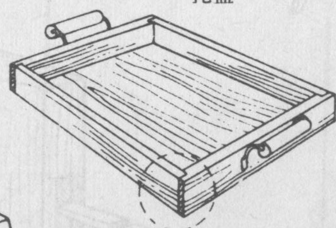
全隐燕尾榫

单榫

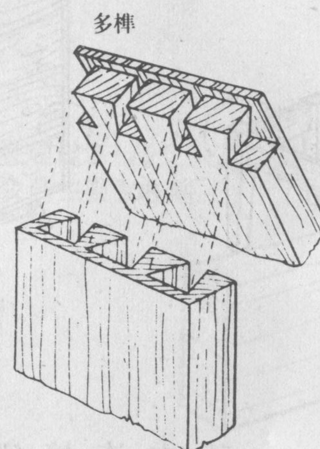


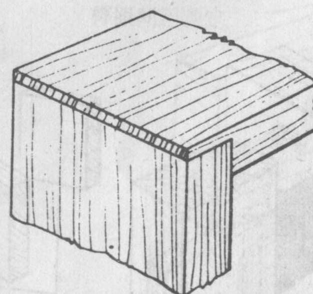
应用实例

托盘



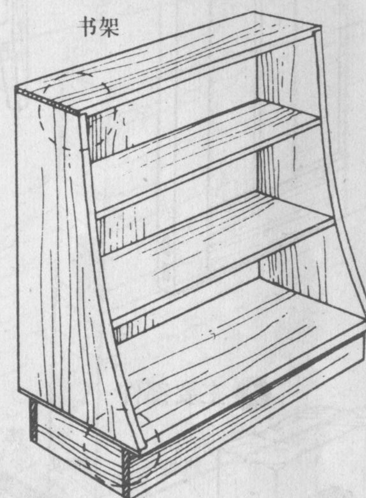
多榫





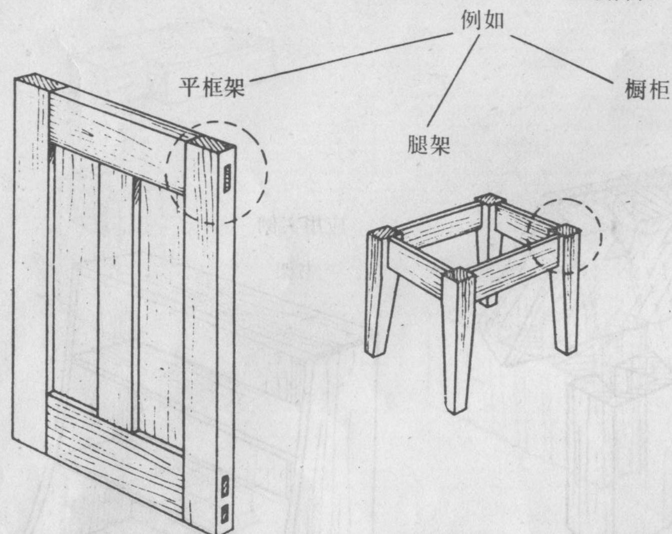
应用实例

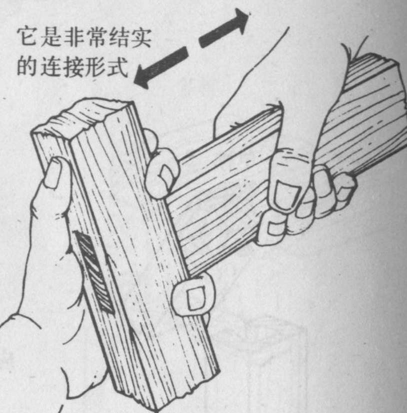
书架



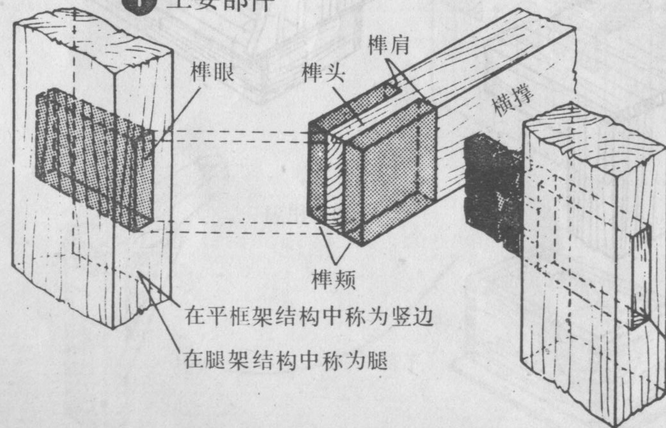
直角榫入门

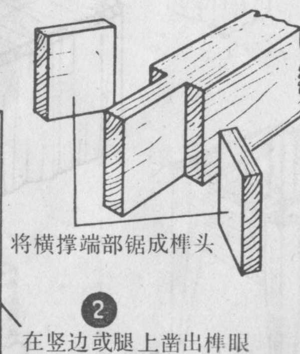
直角榫广泛用于许多结构形式

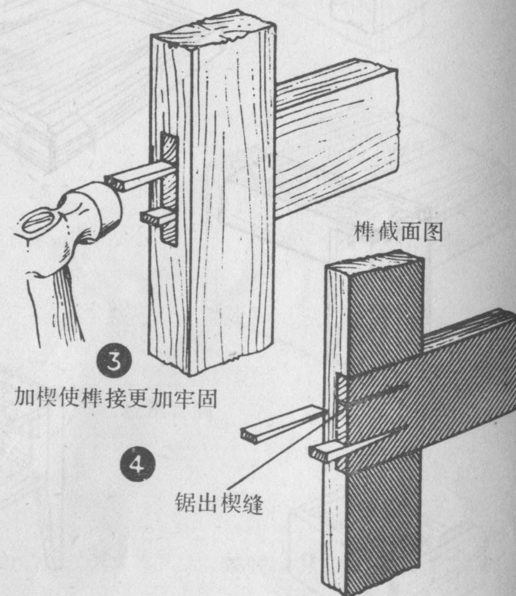




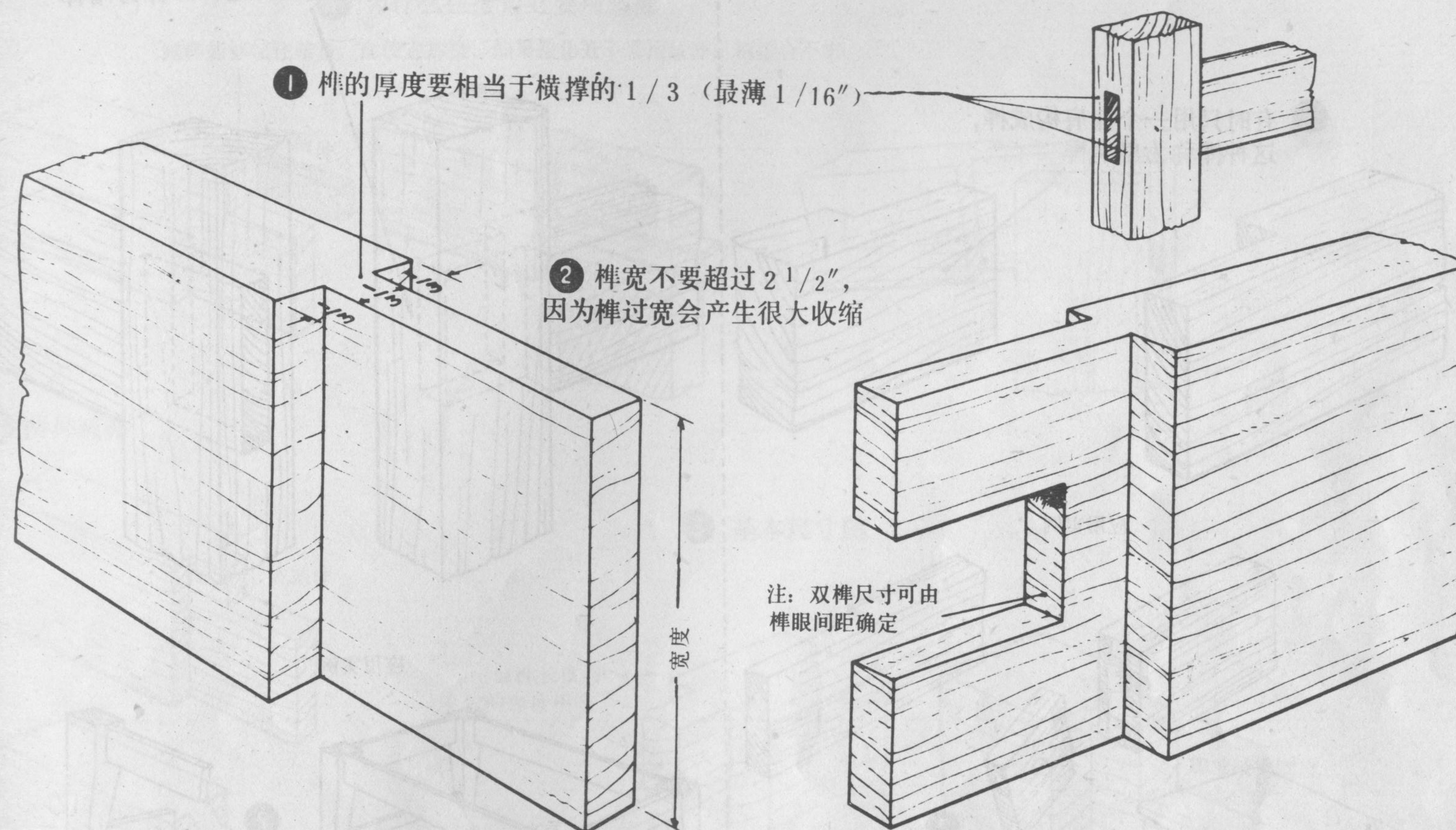
基本连接详图





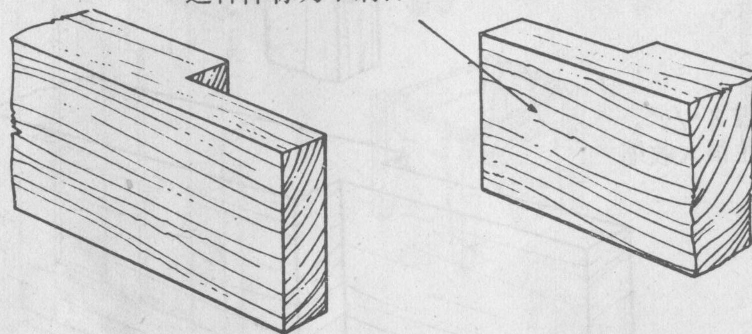


基本尺寸图

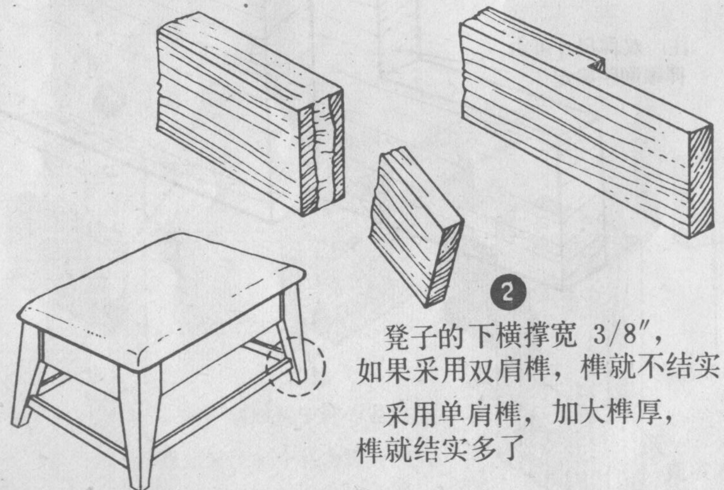


❶ 榫的厚度要相当于横撑的 1/3 （最薄 1/16″）
1/3
1/3
1/3
❷ 榫宽不要超过 2 1/2″，
因为榫过宽会产生很大收缩
宽度
注：双榫尺寸可由
榫眼间距确定

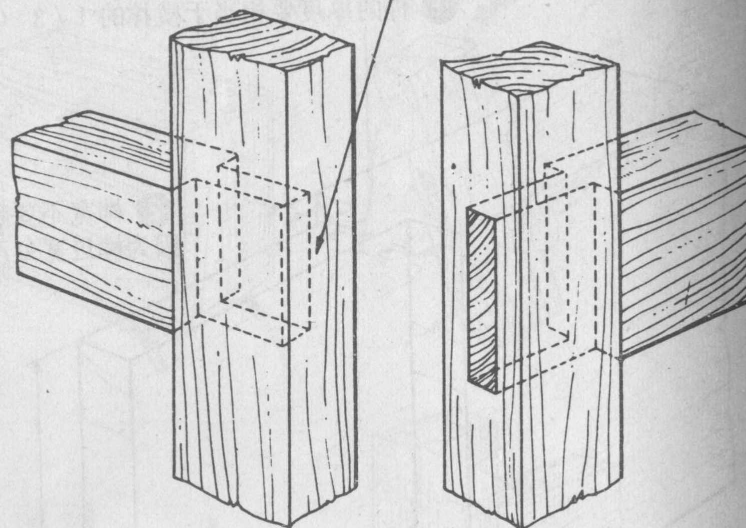
单肩榫详图



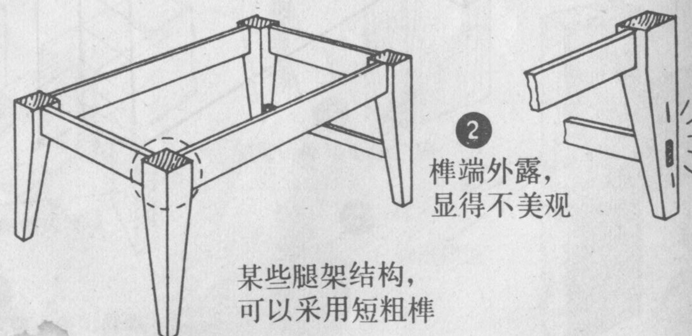
应用实例



暗榫



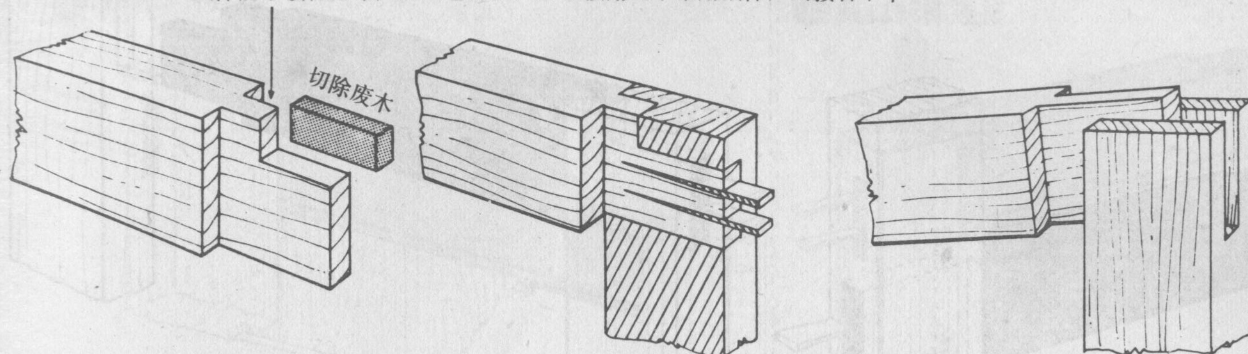
应用实例



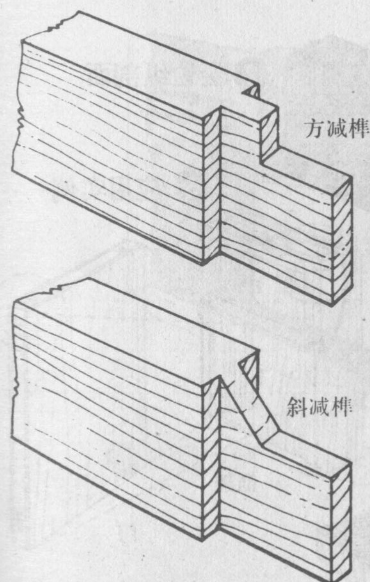
减 榫 详 图

❶ 为什么在接角处要用减榫

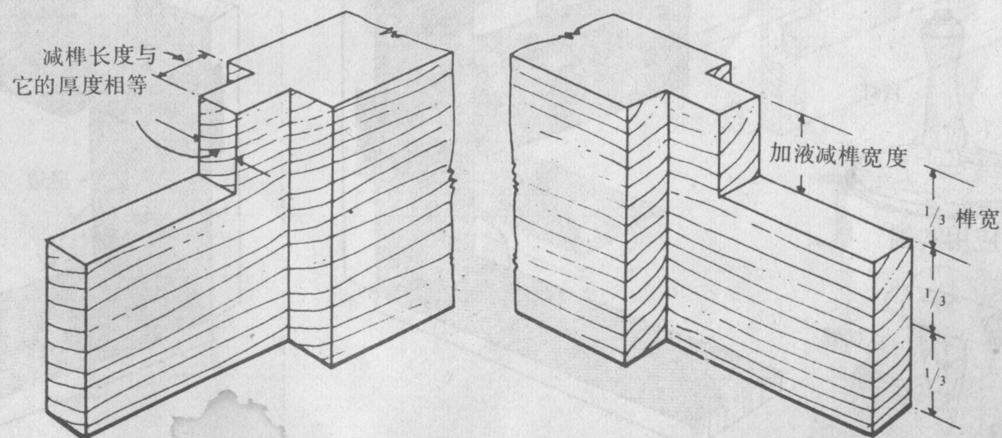
减榫能够锁住接角，能使它加楔，如果接角处不采用减榫，则接合不牢



❷ 两种减榫

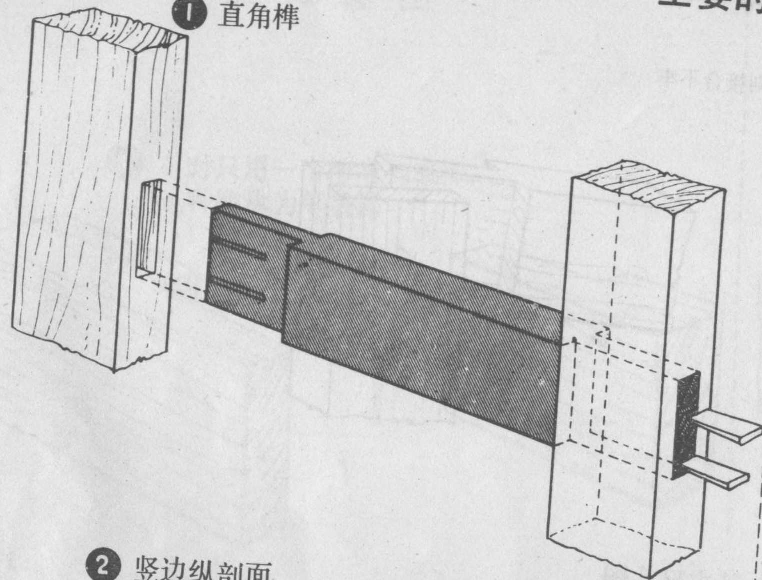


❸ 基本尺寸图

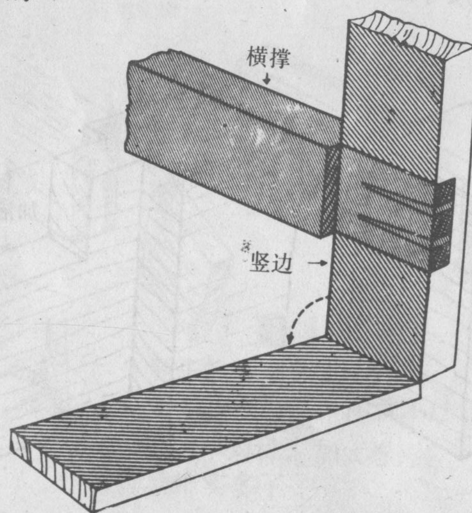


主要的直角榫接: 1

❶ 直角榫



❷ 竖边纵剖面

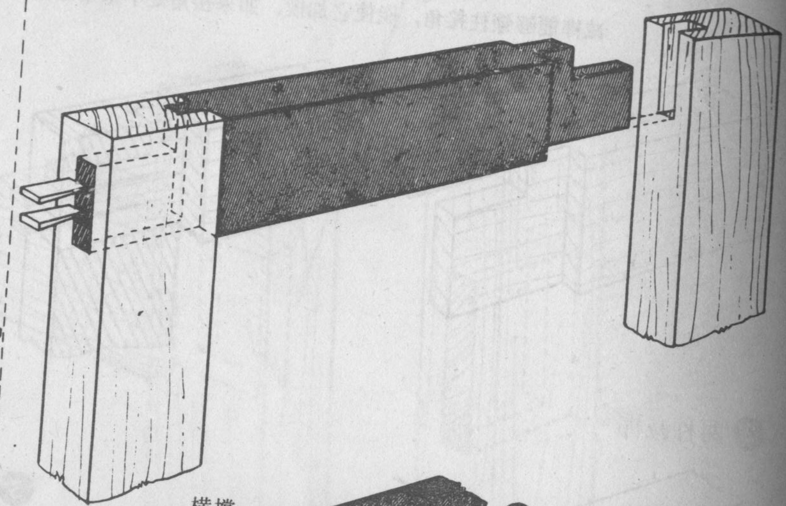




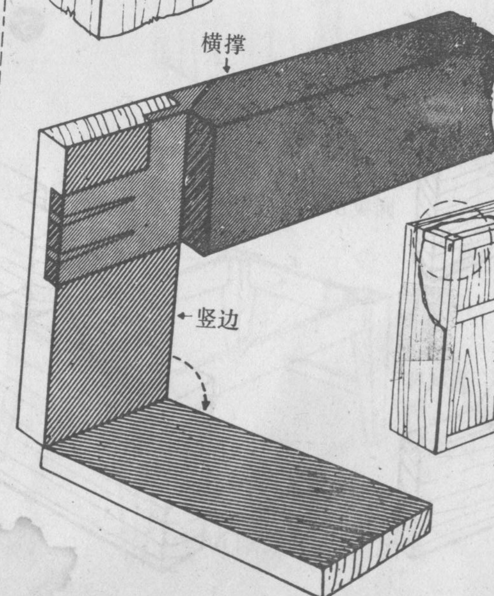
❸ 应用实例



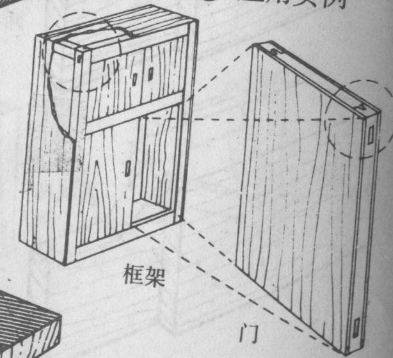
❶ 减榫



❷ 竖边纵剖面

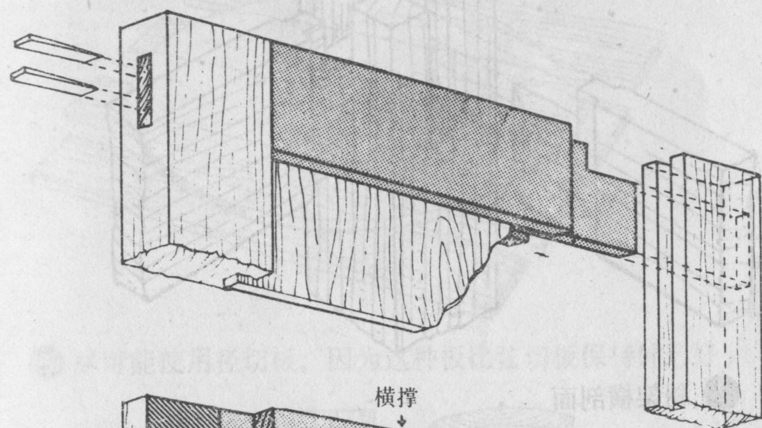


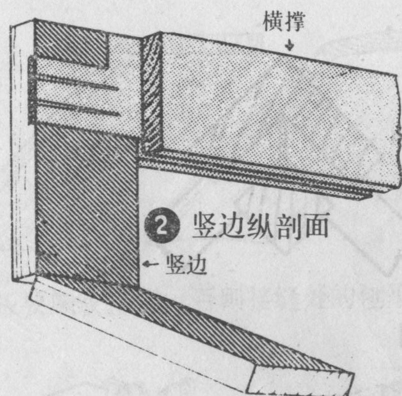
❸ 应用实例



主要的直角榫接：2

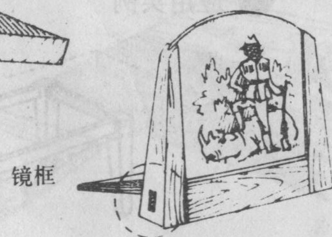
❶ 开槽减榫连接



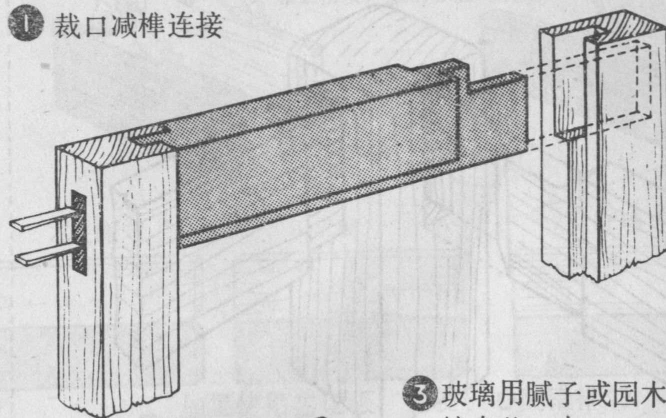


❷ 竖边纵剖面

❸ 应用实例



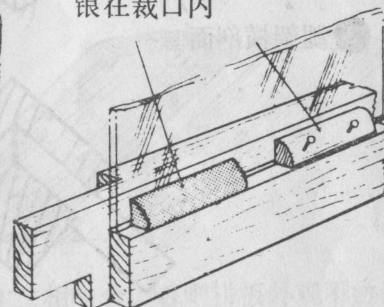
❶ 裁口减榫连接



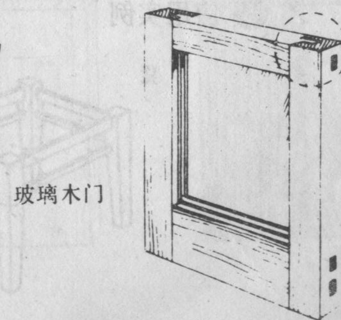


❷ 竖边纵剖面

❸ 玻璃用腻子或园木条镶在裁口内

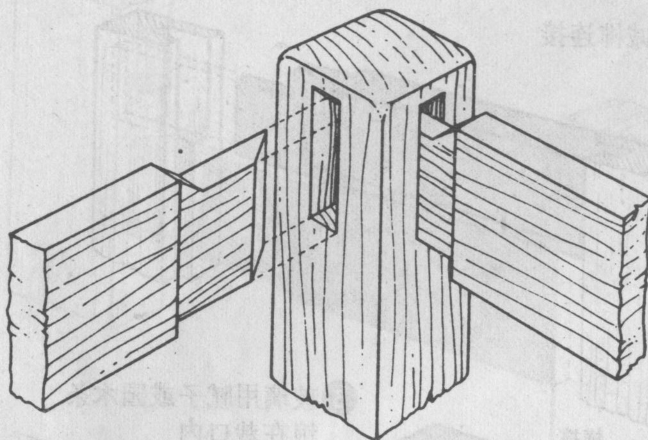


❹ 应用实例

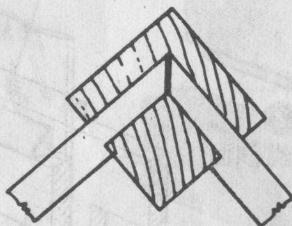


腿架结构用的直角榫接

❶ 斜减榫连接

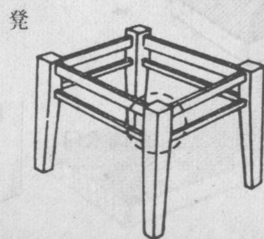


❷ 腿架横剖面

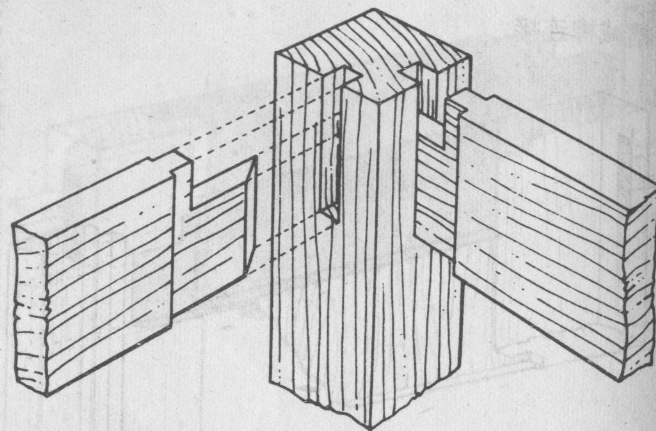


❸ 应用实例

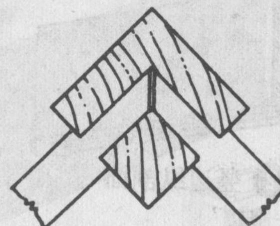
凳



❶ 直减榫连接

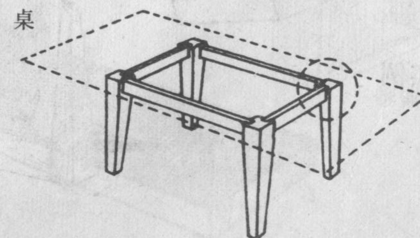


❷ 腿架横剖面



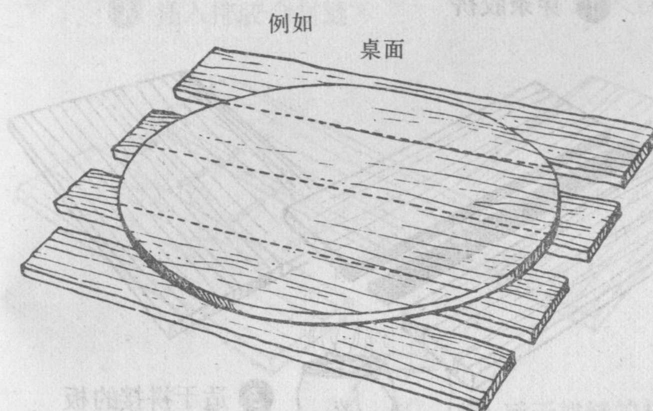
❸ 应用实例

桌



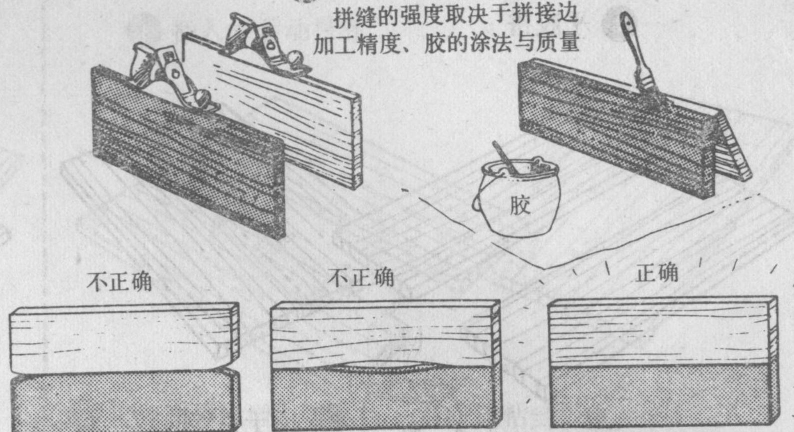
拼 缝 入 门

❶ 拼缝用于窄板拼宽

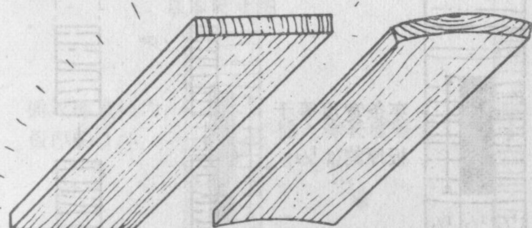


❷ 基本连接详图

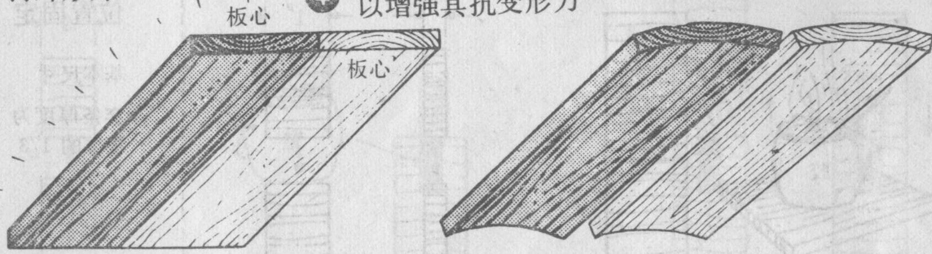
拼缝的强度取决于拼接边加工精度、胶的涂法与质量



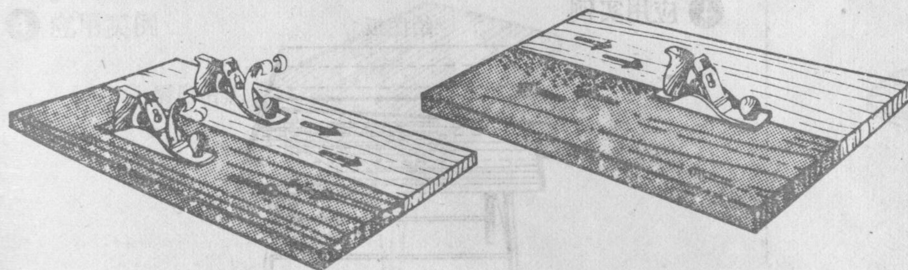
❸ 尽可能使用径切板，因为这种板比弦切板保持外形好



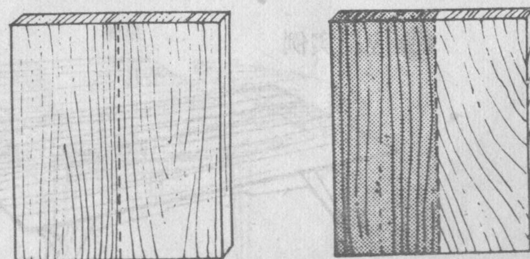
❹ 如果使用弦切板，则使板心交错排列，以增强其抗变形力



❺ 木板要顺纹排列，否则接缝处的刨平工作会遇到困难

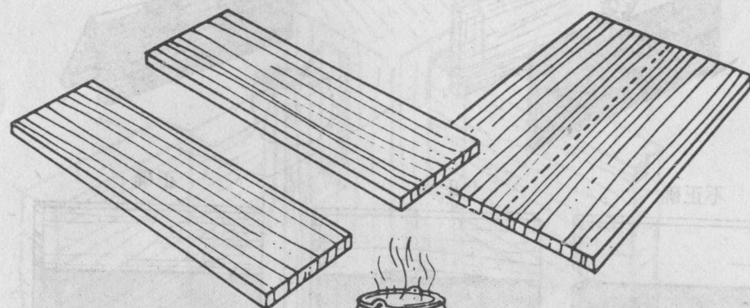


❻ 板的颜色和木纹相吻合，否则拼板外观不协调



主 要 的 拼 缝：1

❶ 平胶拼

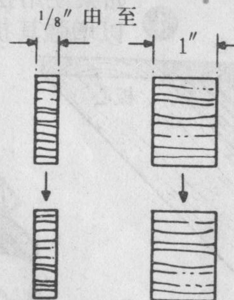


❷ 接缝全用胶接

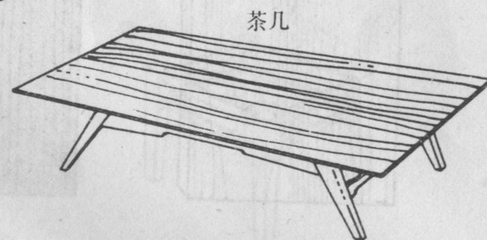




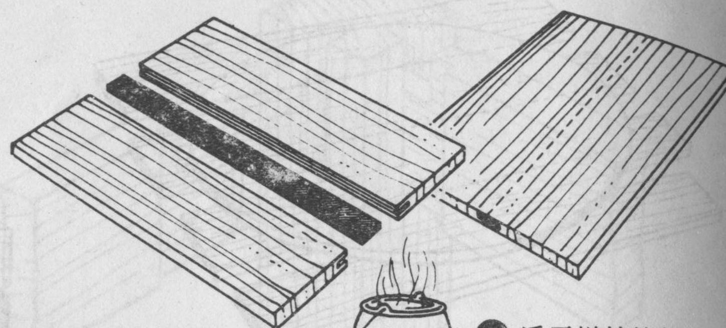
❸ 适于拼接的板



❹ 应用实例



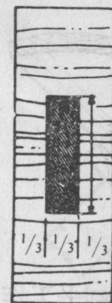
❶ 穿条胶拼



❷ 穿条使接缝牢固，位置固定

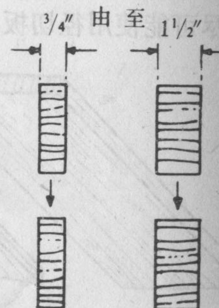
基本尺寸

穿条厚度为板厚的 1/3

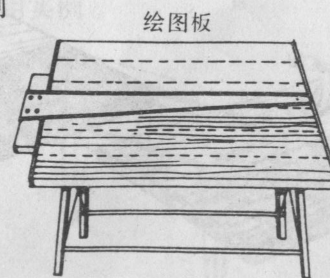


穿条宽度等于板厚的 1 1/2

❸ 适于拼接的板

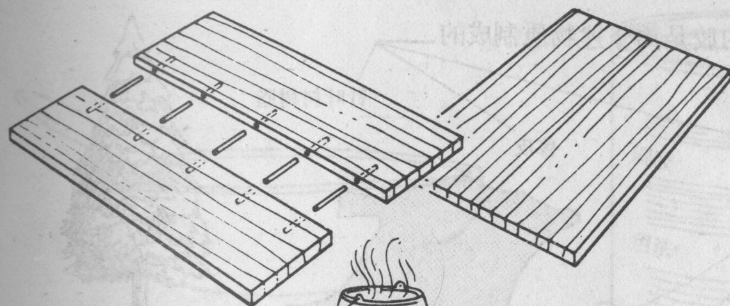


❹ 应用实例



主要的拼缝: 2

❶ 插入榫胶合拼缝





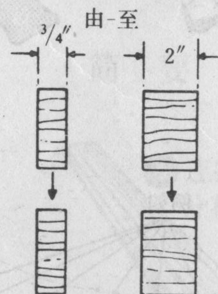
❷ 插入榫胶拼使接缝牢固，位置固定

基本尺寸图

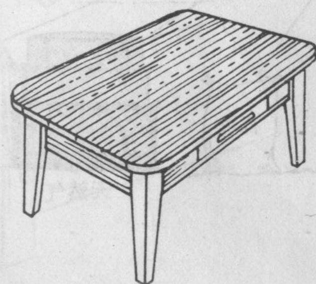
插入榫直径为板厚的 1/3

插入榫长度等于 3 × 板厚

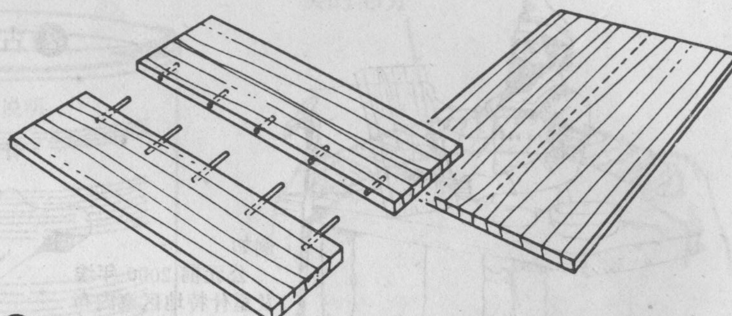
❸ 适于拼缝的板



❹ 应用实例

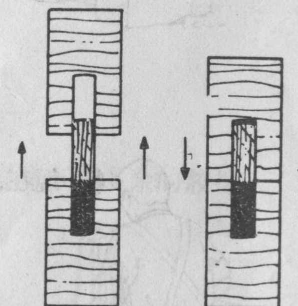


❶ 插入榫活动拼缝

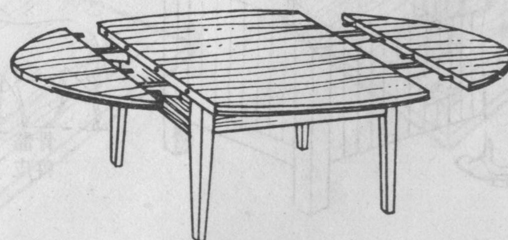


❷ 接缝边不涂胶，插入榫只有一端粘到板上，另一端不涂胶，可自由开合





❸ 应用实例



胶 入 门:1

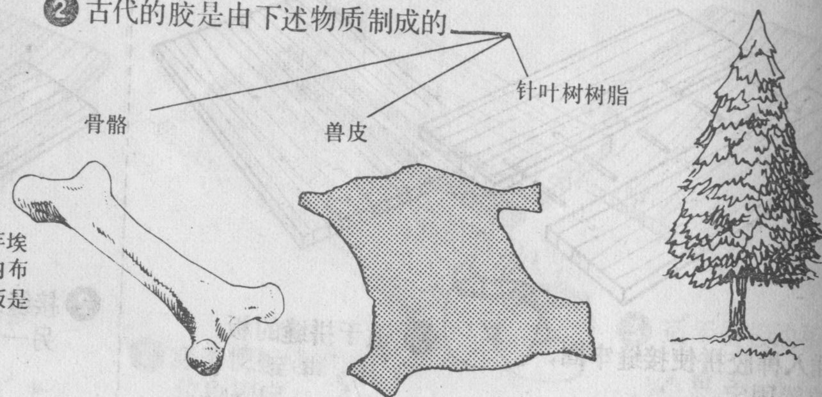
❶ 胶的应用已有 4000 多年历史



例如

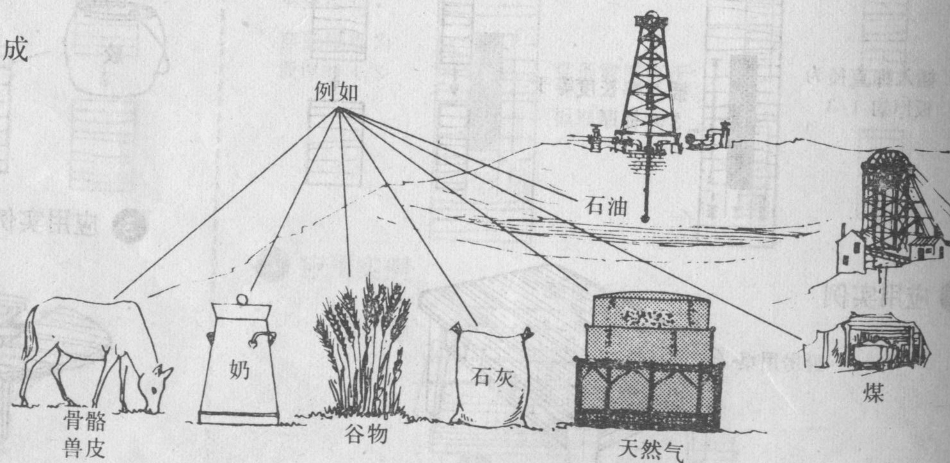
公元前 2000 年埃及里什特地区塞内布提斯墓碑的铭文板是用胶粘的

❷ 古代的胶是由下述物质制成的



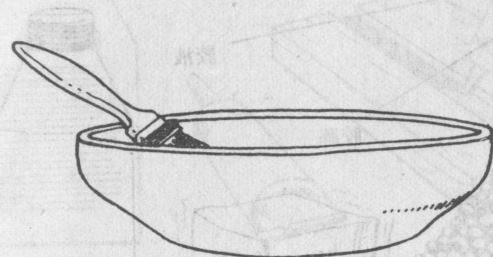
❸ 现在，胶用各种材料制成





胶入门: 2

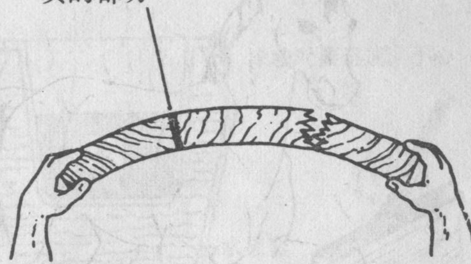
④ 正确配胶与用胶十分重要



⑤ 一定要遵照生产厂的使用说明

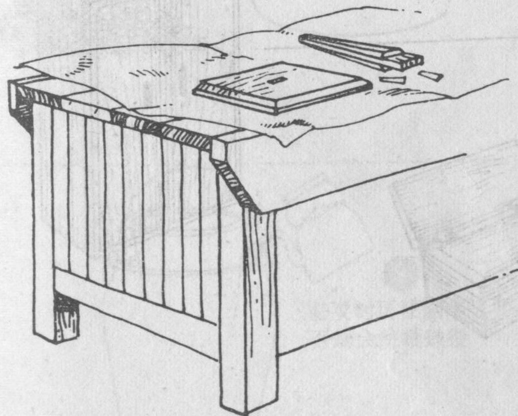


⑥ 注: 如果配胶与用胶正确, 则胶接处是木结构中最结实的部分

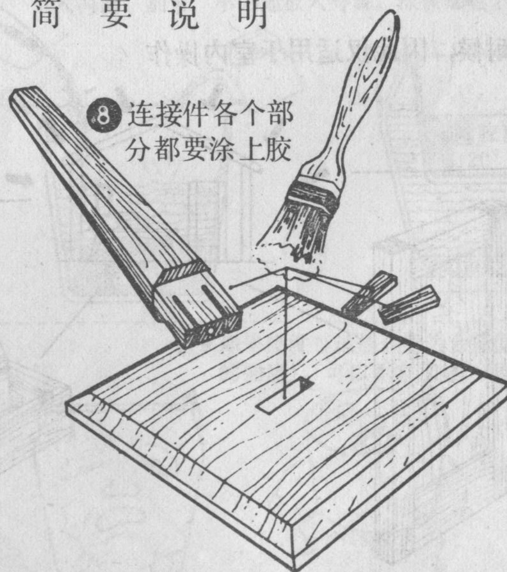


简要说明

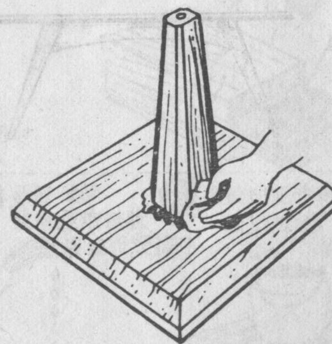
⑦ 工件下面垫报纸或木板, 防止工作台粘上胶



⑧ 连接件各个部分都要涂上胶

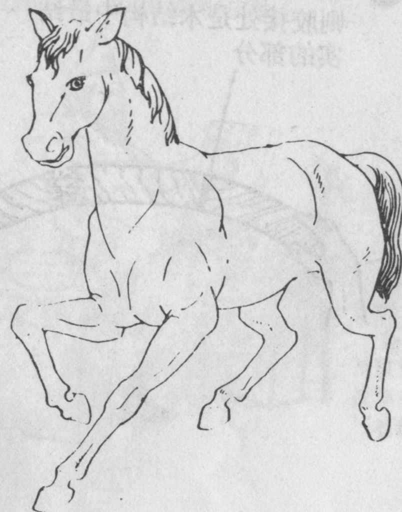


⑨ 用湿抹布把多余的胶擦去

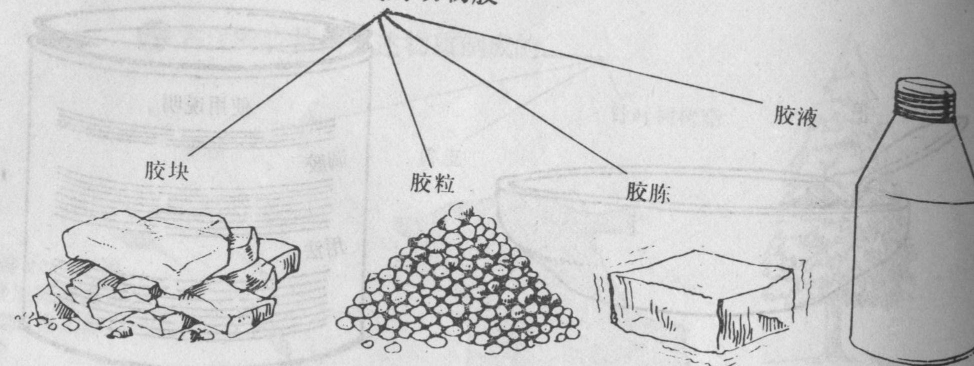


动物胶

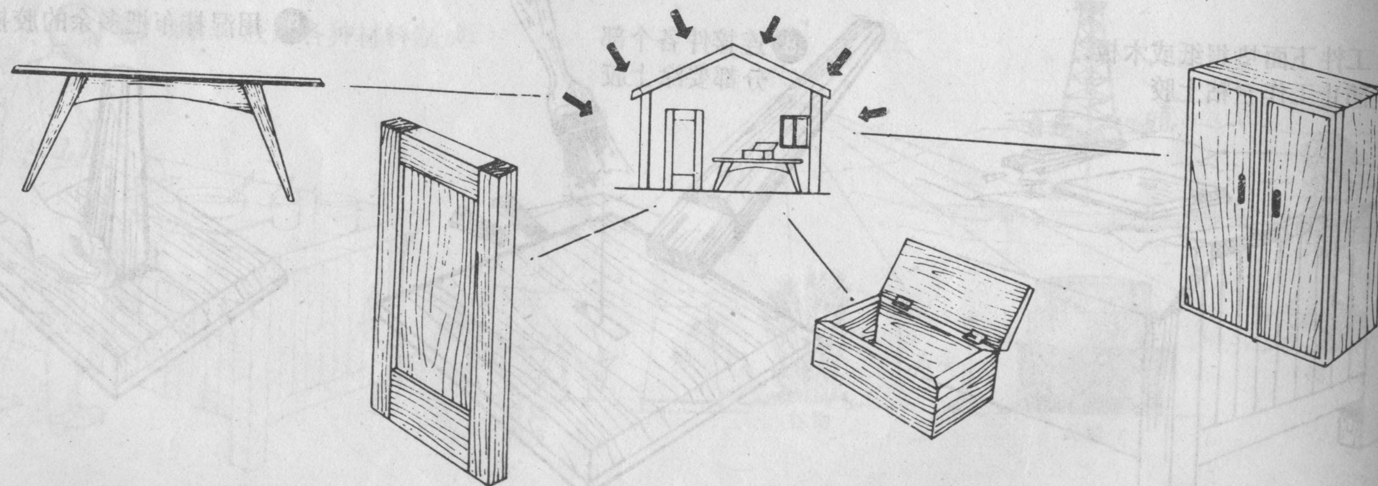
❶ 动物胶是由骨骼和兽皮制成的



❷ 可以购买下述形式的动物胶



❸ 这种胶不耐候，因此仅适用于室内操作



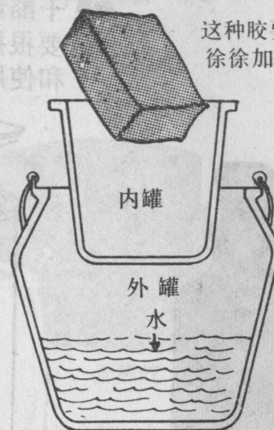
动物胶

4 液态胶

通常这种胶拿来就可以用，但在天冷时，要微微加热



5 胶胨



这种胶要放进胶罐，徐徐加热至 120°F 左右



涂胶时要迅速，小心



6 块状或粒状胶

7 这种胶要用水泡 24 小时

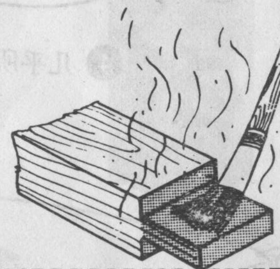


倒入内罐，加水，小心地放入外罐，徐徐加热至 120°F





8 涂胶时要迅速，小心

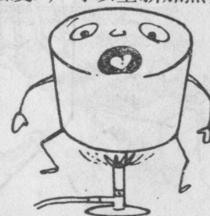




9 必要时可注满水夹套，否则会使罐破裂

10 如果胶没有过热（过热会降低它的强度），可以重新加热，再用





11 调胶试验 胶液呈细链状 液滴缓缓流下



12 涂胶时把热罐放在一块旧板上，以保护工作台面



干 酪 素

❶ 干酪素是用酸处理酸奶制成的

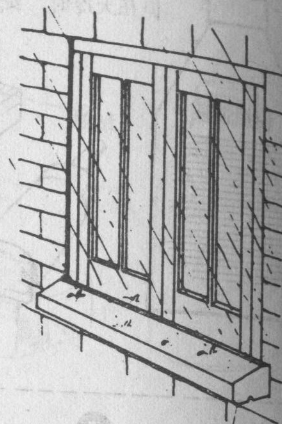




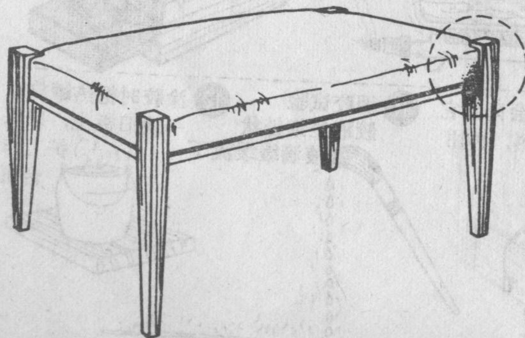
❷ 干酪素是以胶粉的形式买来的，要根据生产厂家的说明来调制和使用

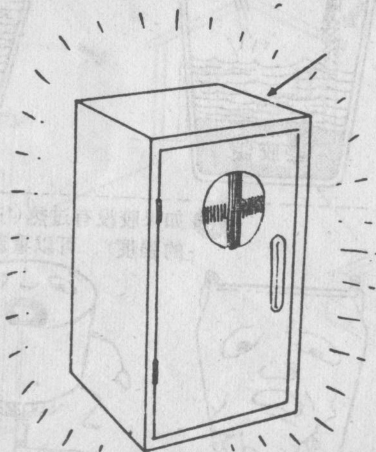


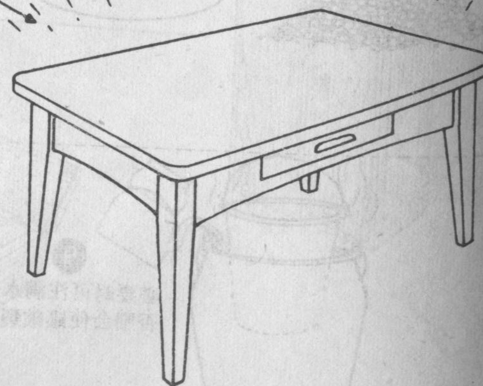
❸ 某些干酪素是耐候的



❹ 几乎所有的干酪素都易沾污，因此明智的作法是只有外部涂漆时才用这种胶

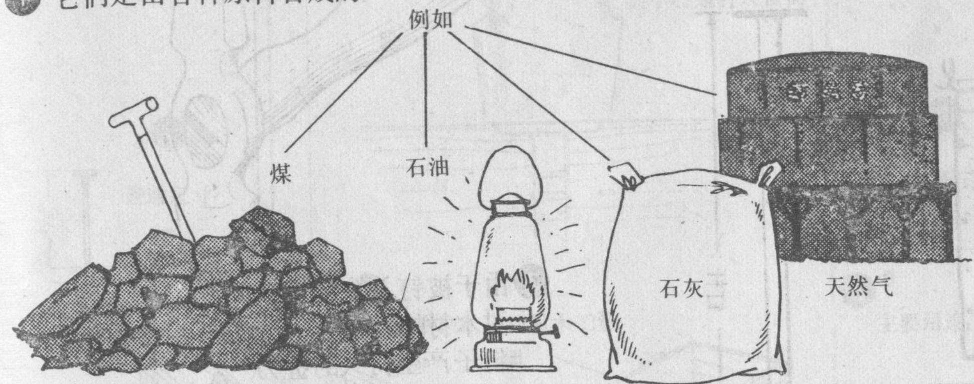






合成树脂胶

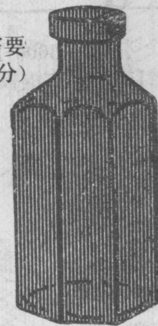
❶ 它们是由各种原料合成的



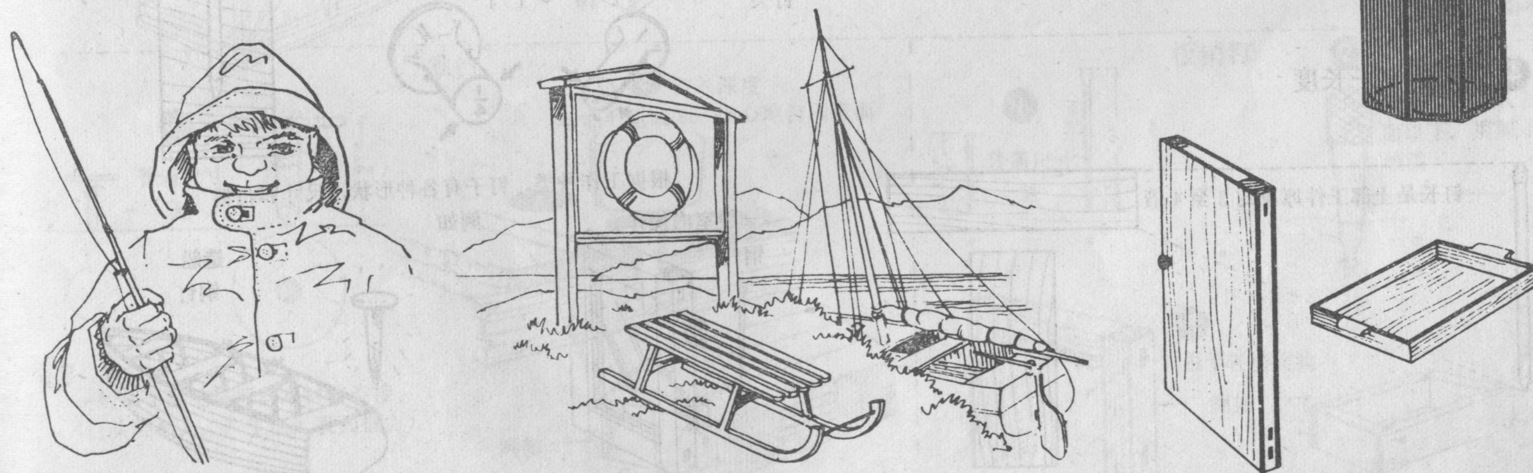
❷ 它们可以购买粉状或液状产品，要根据生产厂家的说明来调制和使用



❸ 注：
有些胶种需要硬化剂（凝固组分）



❹ 合成树脂胶耐候，因此室外、室内使用均可



钉子入门

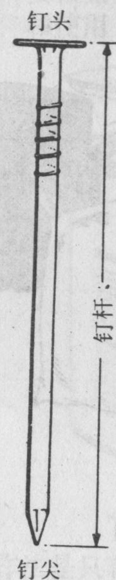
❶ 钉子的使用已有4000多年历史

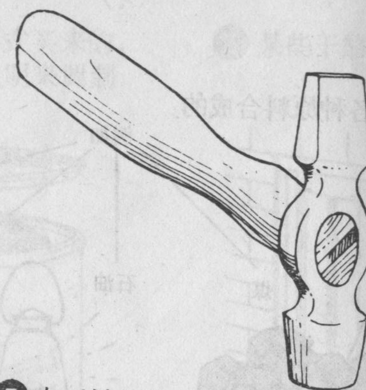
例如



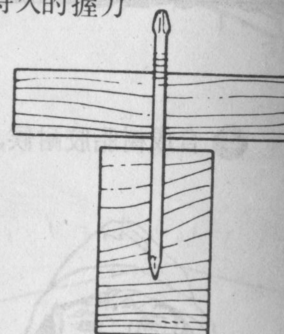
公元前3000-2300年，伊拉克阿鲁巴依德地区使用铜钉把伊都古铜板钉在木心上

❷ 主要部件



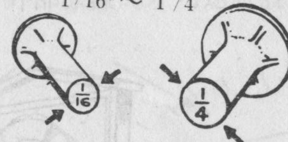


❸ 由于被钉入的金属对木材的摩擦力，钉子产生持久的握力

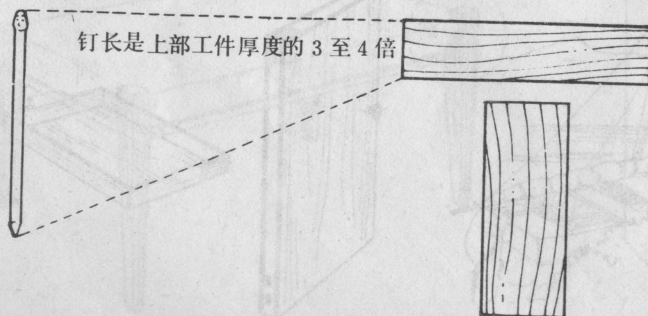


普通尺寸范围

1/16″～ 1/4″



❹ 合适的钉子长度

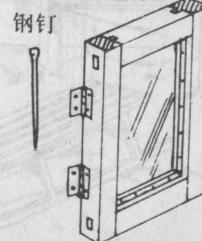


根据工作种类，钉子有各种形状，尺寸和材料

例如

一般室内操作

钢钉

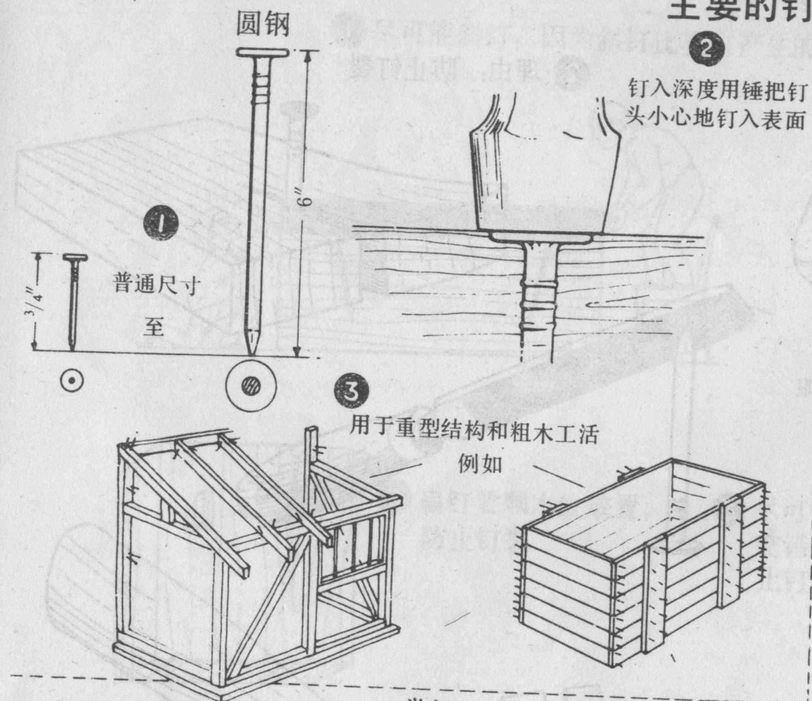


造船

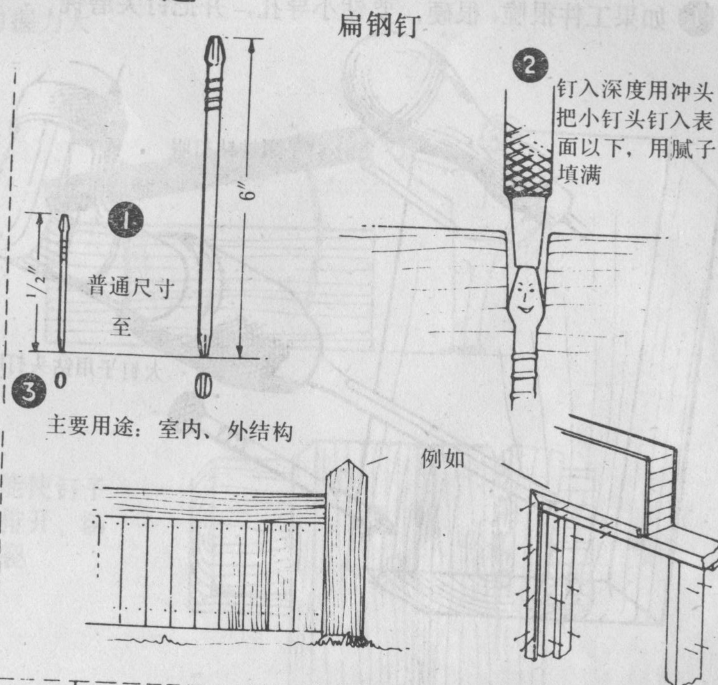
铜钉



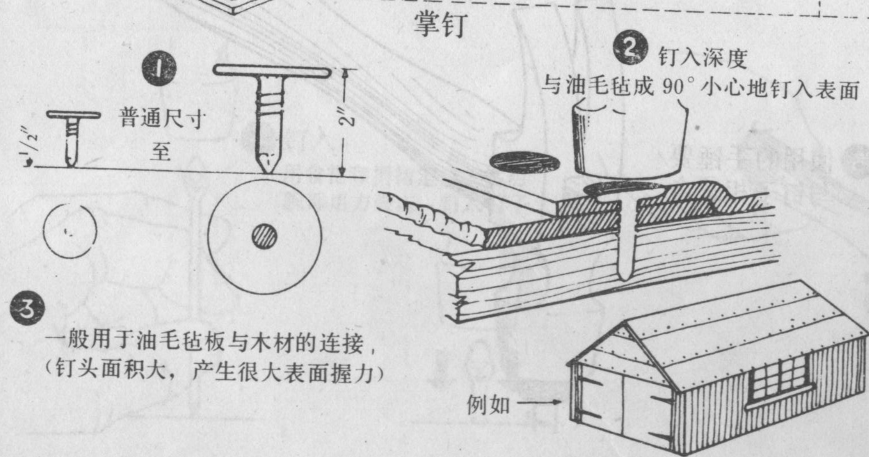
主要的钉子及其用途



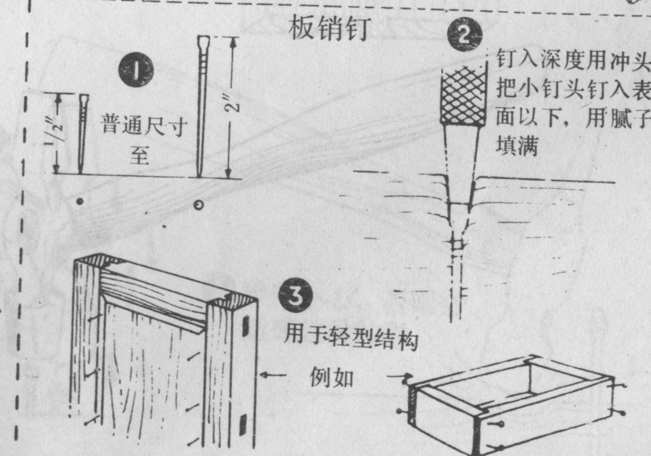
圆钢
钉入深度用锤把钉
头小心地钉入表面
普通尺寸
至
3/4″
6″
用于重型结构和粗木工活
例如



扁钢钉
钉入深度用冲头
把小钉头钉入表
面以下，用腻子
填满
1/2″
6″
普通尺寸
至
主要用途：室内、外结构
例如



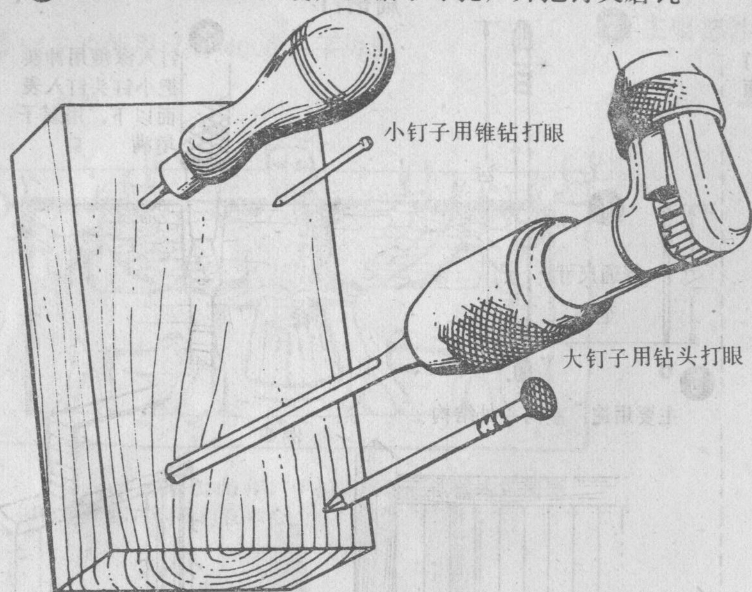
掌钉
钉入深度
与油毛毡成 90° 小心地钉入表面
1/2″
2″
普通尺寸
至
一般用于油毛毡板与木材的连接，
（钉头面积大，产生很大表面握力）
例如



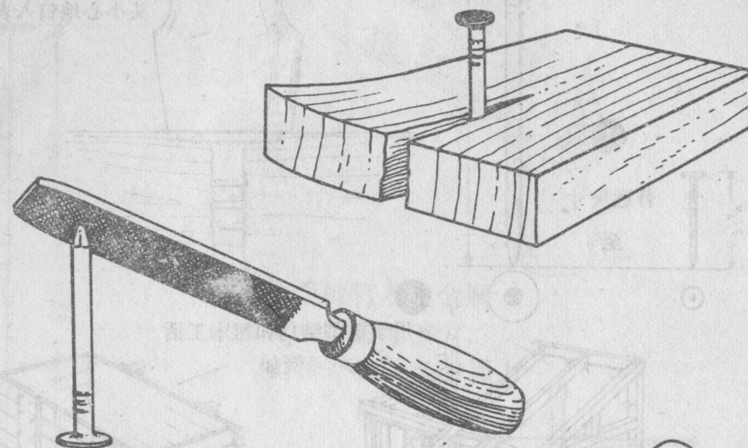
板销钉
钉入深度用冲头
把小钉头钉入表
面以下，用腻子
填满
1/2″
2″
普通尺寸
至
用于轻型结构
例如

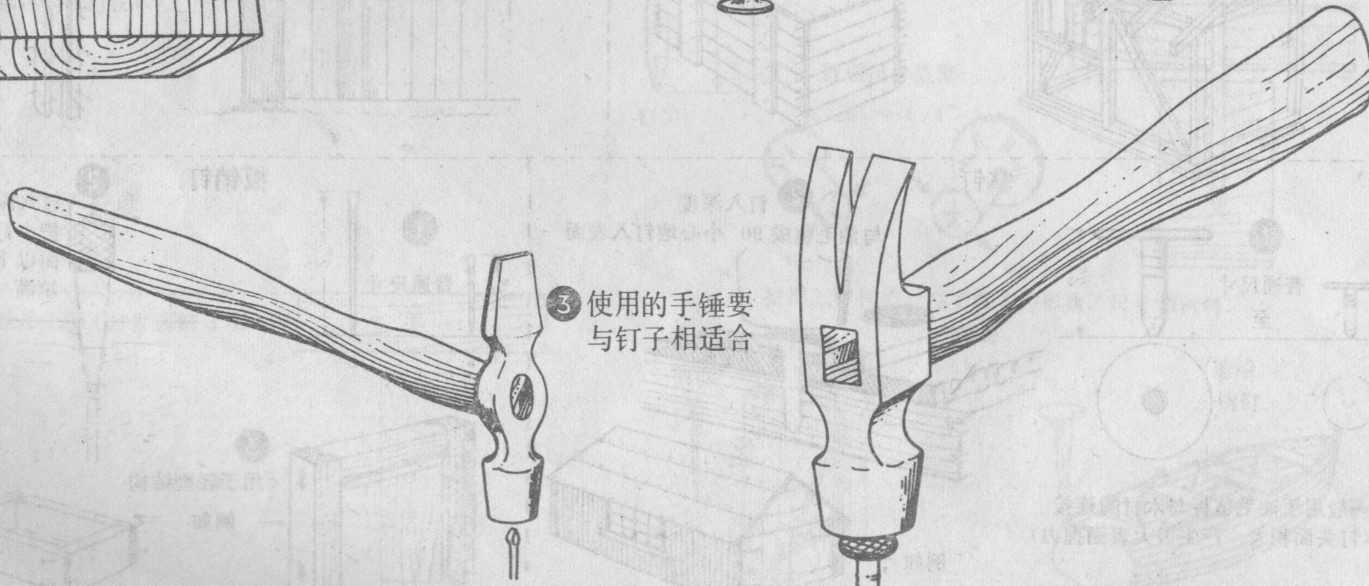
钉钉的准备工作

❶ 如果工件很脆，很硬，要钻小导孔，并把钉尖磨钝



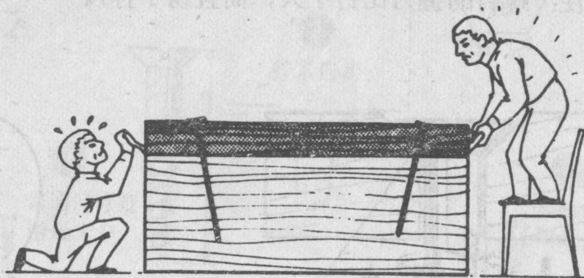
❷ 理由：防止钉裂

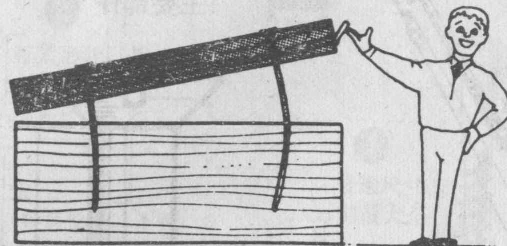


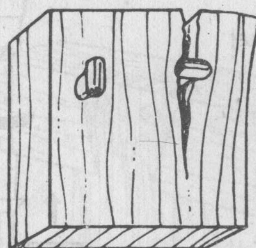


钉 钉

❶尽可能斜钉，因为斜钉比直钉产生的握力大

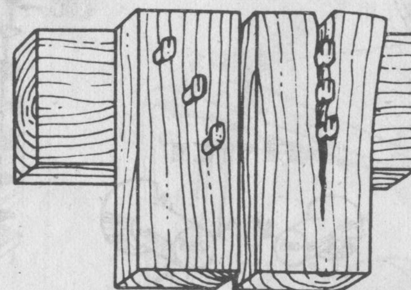






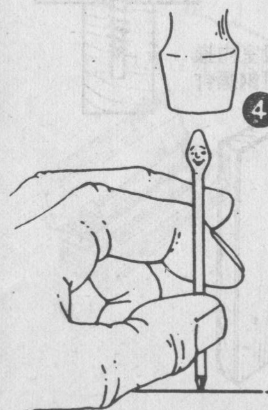
❷扁钉要顺木纹放置，防止钉裂

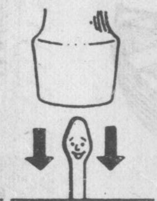
❸尽可能使钉子交错排开，防止钉裂

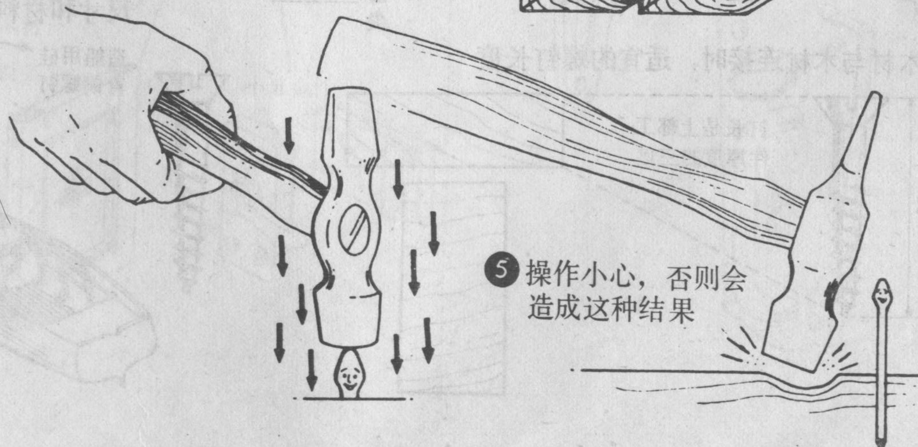


❹钉入

用食指和拇指定位，然后腕部用力敲击，钉入钉子





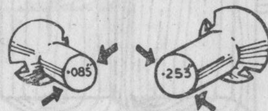


❺操作小心，否则会造成这种结果

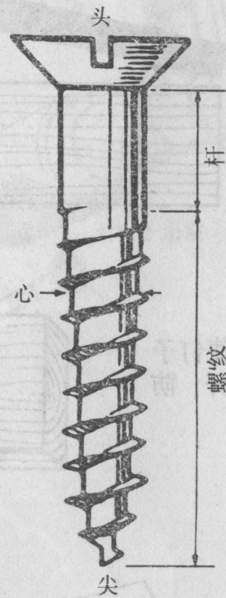
螺 钉 入 门

❶ 18世纪以前，螺钉应用不广

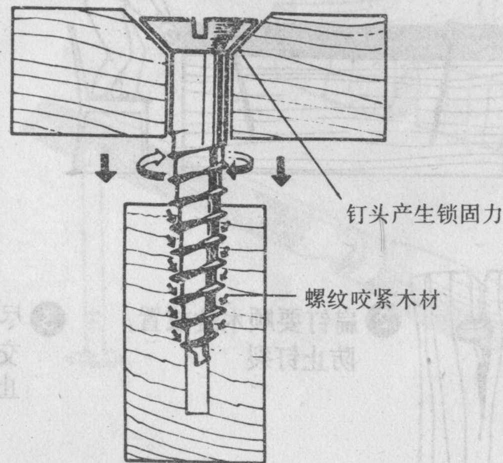




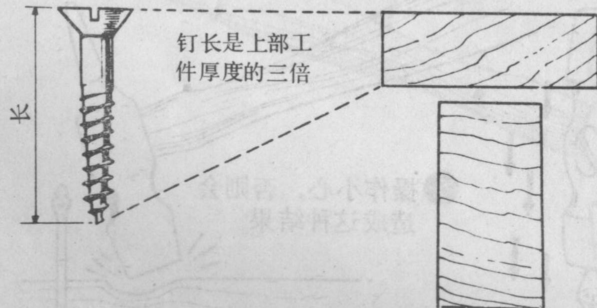
❷ 主要部件



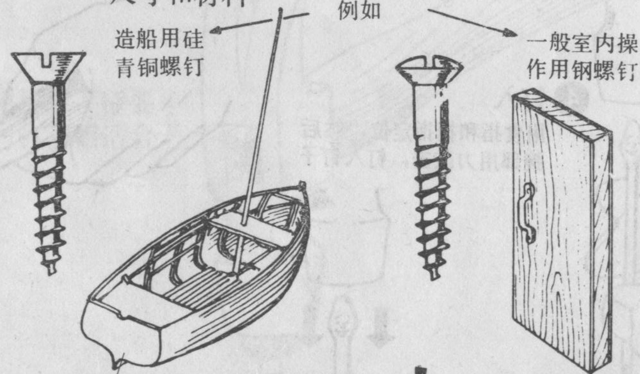
❸ 注：螺钉的握力比钉子大，而且易于拧入



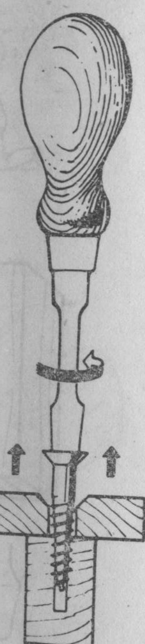
❹ 木材与木材连接时，适宜的螺钉长度



❺ 根据工作种类，螺钉有各种形状，尺寸和材料

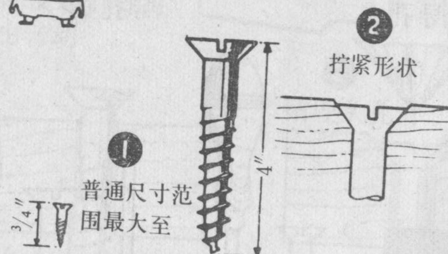


主要的螺钉及其用途

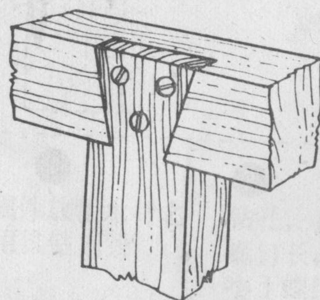


沉头钻孔螺钉

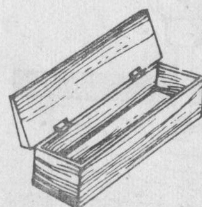


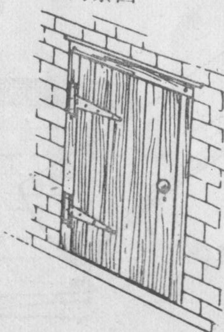


③ 用于木材与木材的紧固



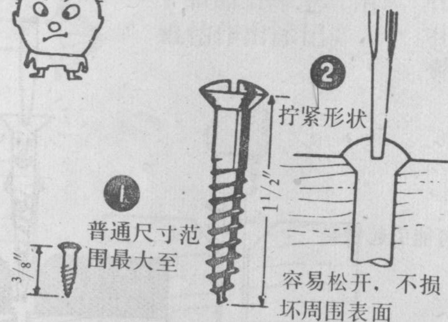
以及合页在木材上的紧固

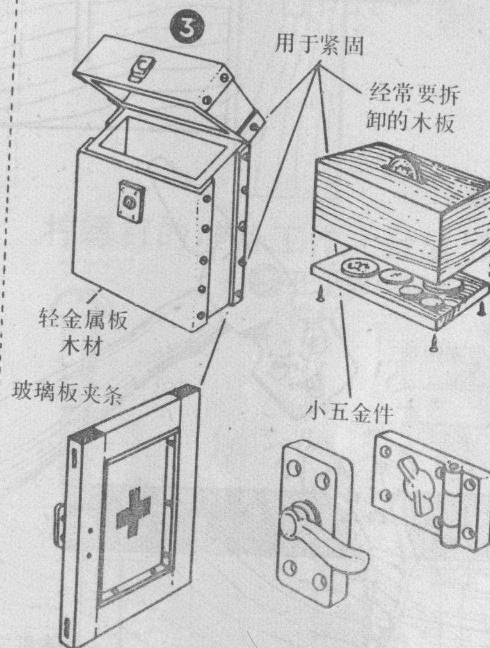




半沉头钻孔螺钉

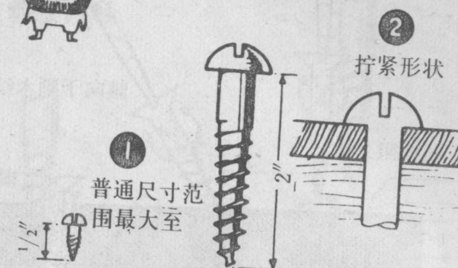


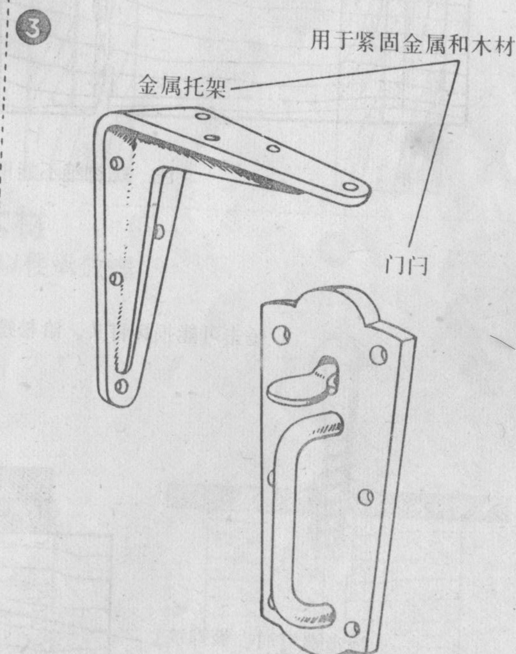




半圆头螺钉

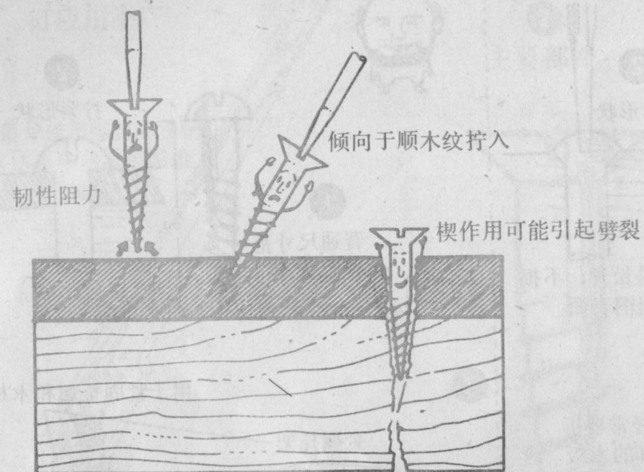






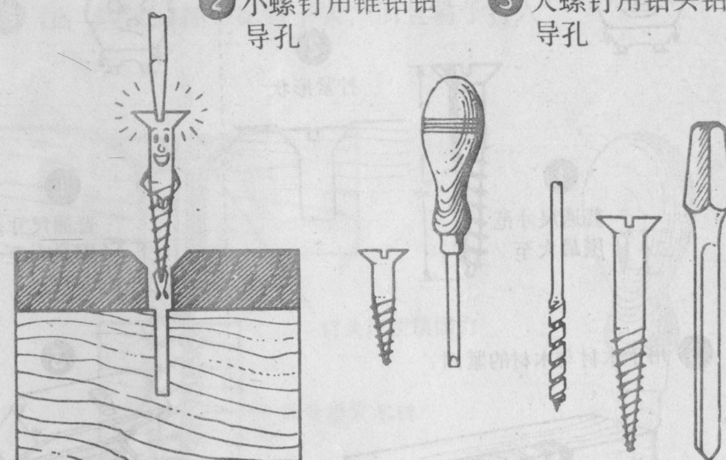
为什么要为螺钉钻导孔

❶ 直接向木材中钉螺钉很困难，因此需要钻导孔，协助拧入螺钉

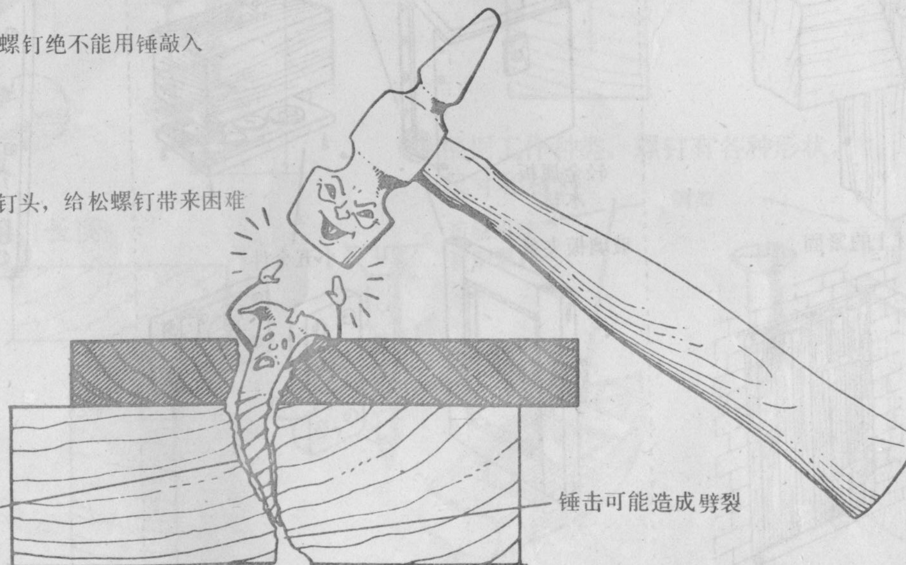


❷ 小螺钉用锥钻钻导孔

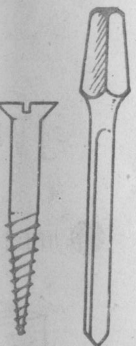
❸ 大螺钉用钻头钻导孔



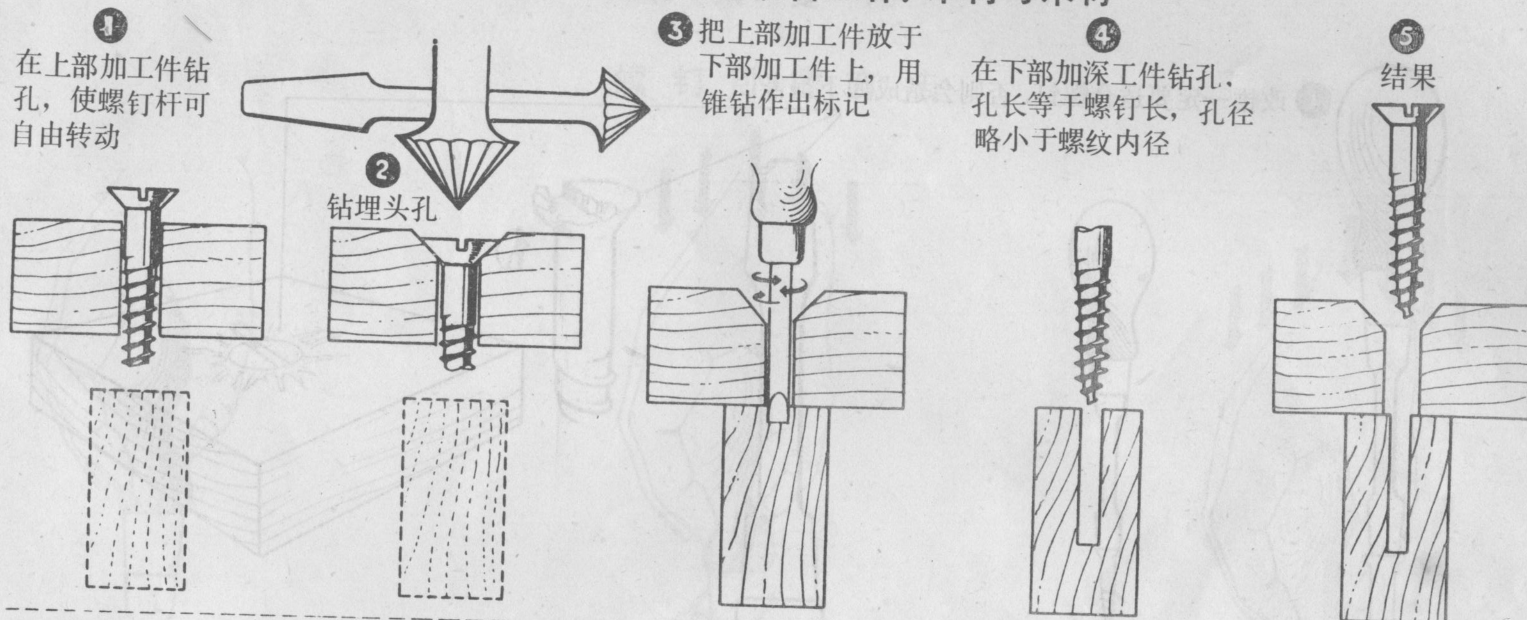
注：螺钉绝不能用锤敲入



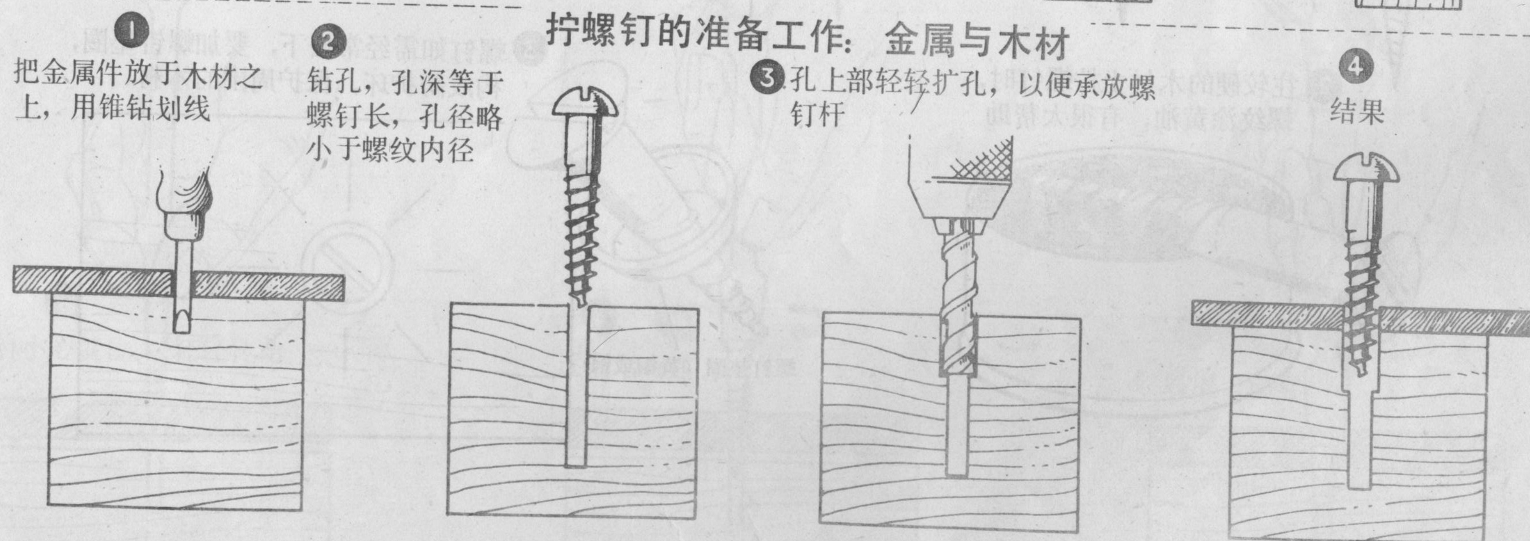
钉用钻头钻



拧螺钉的准备工作：木材与木材

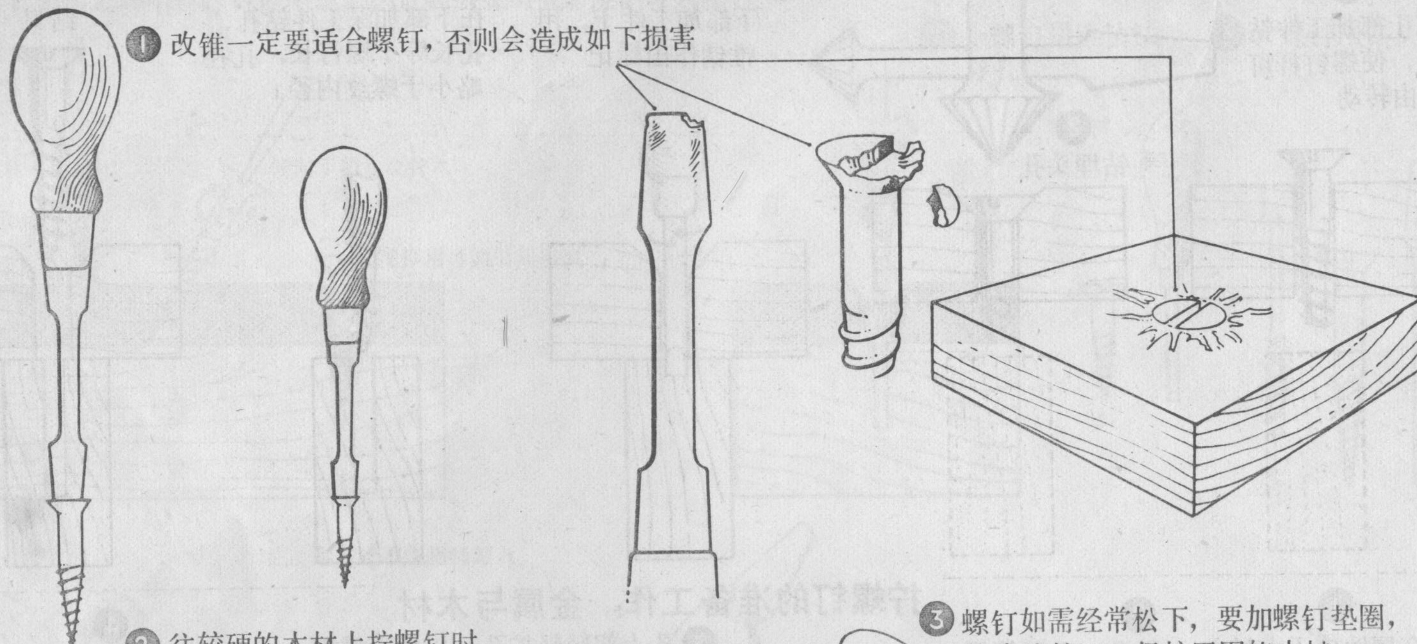


拧螺钉的准备工作：金属与木材

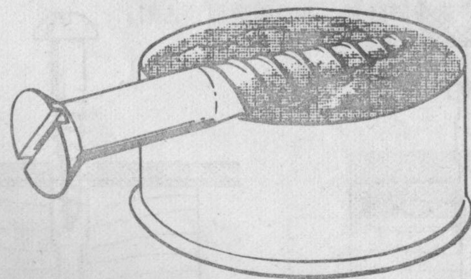


简 要 说 明

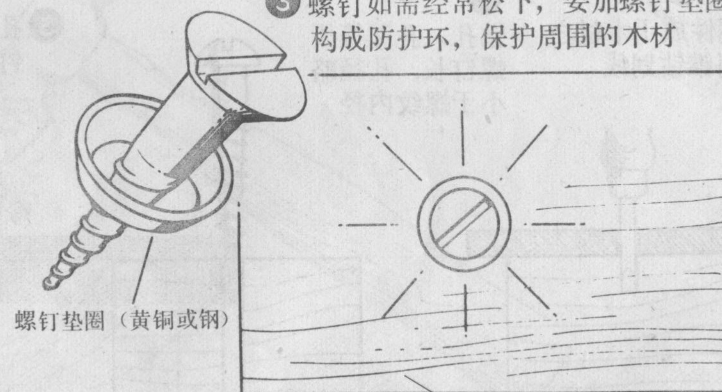
❶ 改锥一定要适合螺钉，否则会造成如下损害



❷ 往较硬的木材上拧螺钉时，螺纹涂黄油，有很大帮助

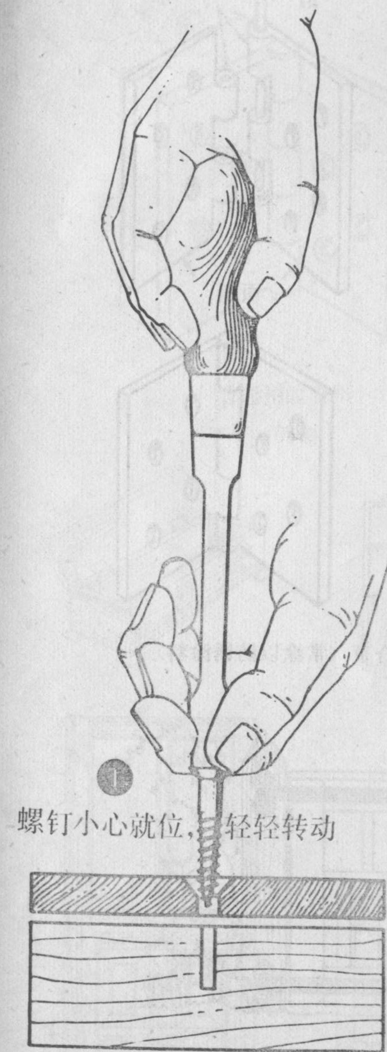


❸ 螺钉如需经常松下，要加螺钉垫圈，构成防护环，保护周围的木材

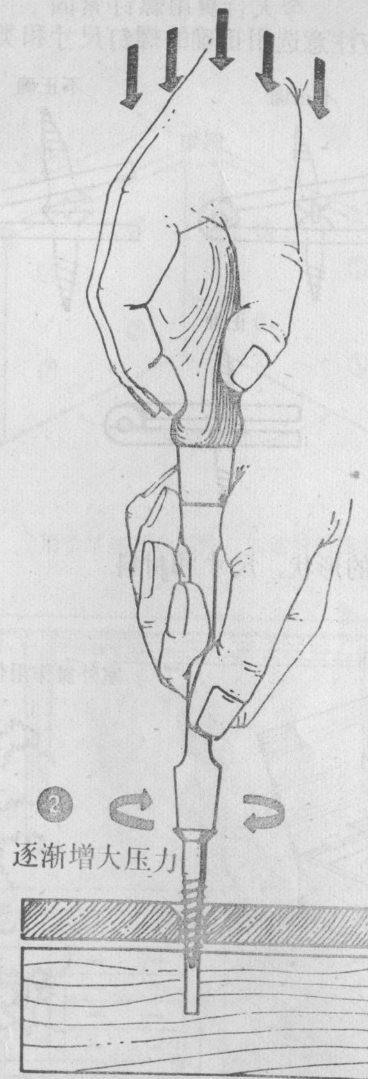




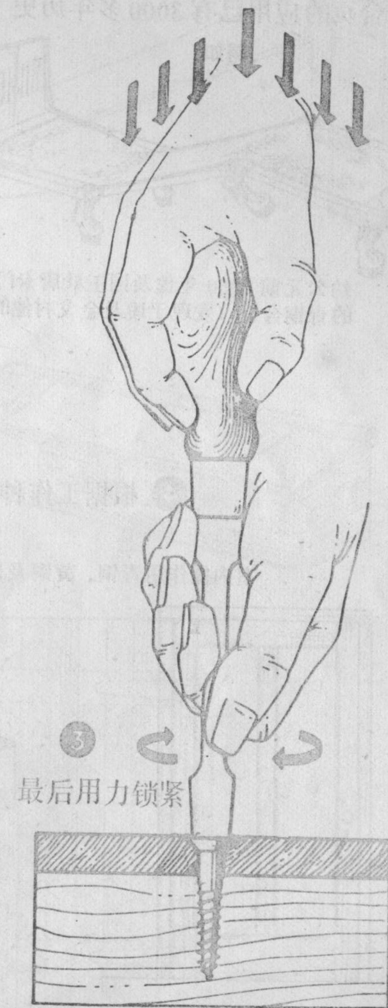
螺钉卧槽方法



①螺钉小心就位，轻轻转动



②逐渐增大压力

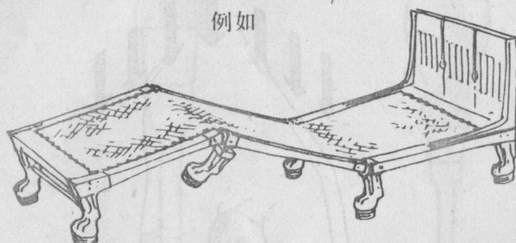


③最后用力锁紧

合 页 入 门

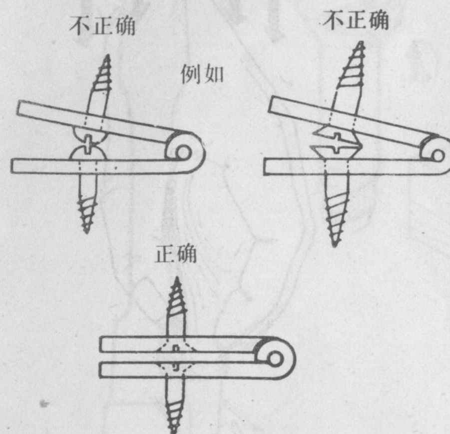
❶ 合页的应用已有3000多年历史

例如

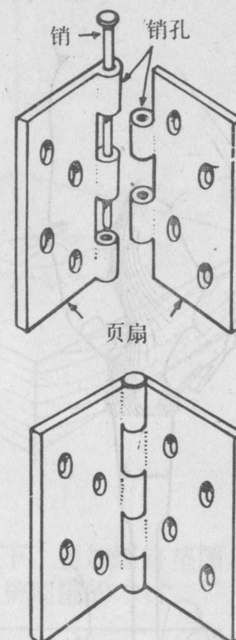


约公元前1350年埃及国王杜唐卡门折迭床用的青铜合页（发现于埃及金戈村他的坟墓中）

❷ 今天合页用螺钉紧固
（应注意选用正确的螺钉尺寸和类型）

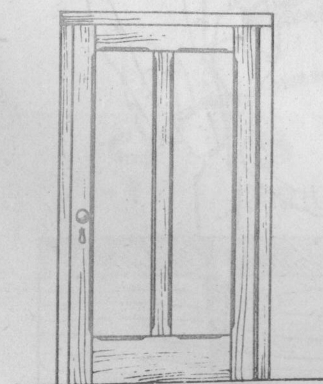


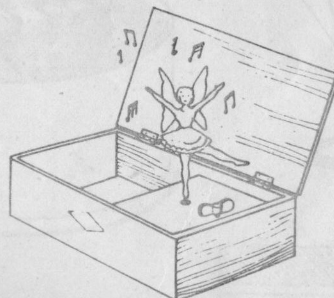
❸ 主要部件



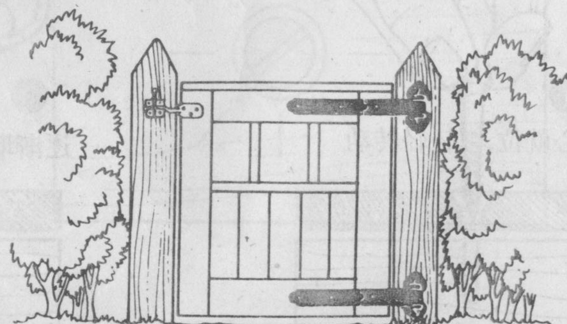
❹ 根据工作种类，合页有不同的形状，尺寸和材料

室内操作用青铜、黄铜及低碳钢合页



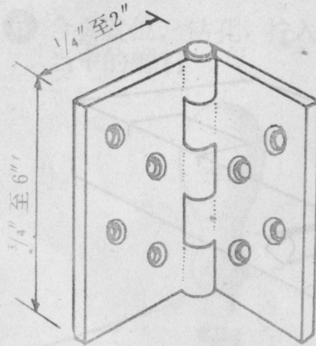


室外操作用低碳钢，锻铁和铸铁合页（常涂以防锈涂料）



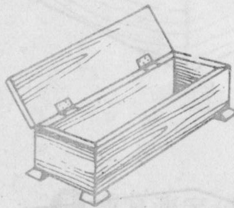
主要的合页及其用途

平合页



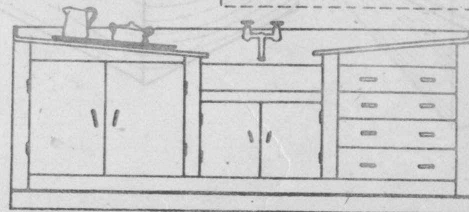
普通用的合页

例如

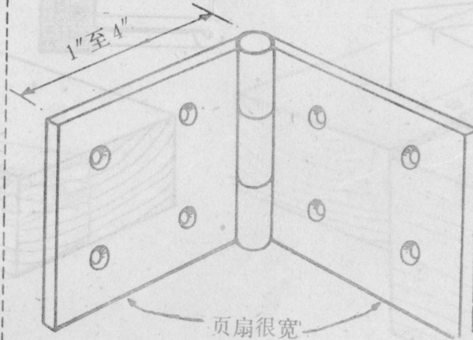




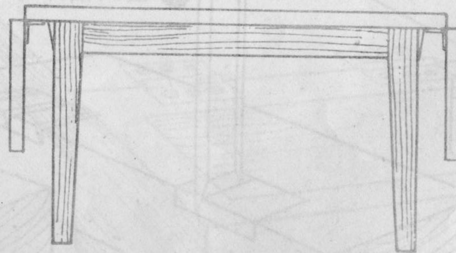




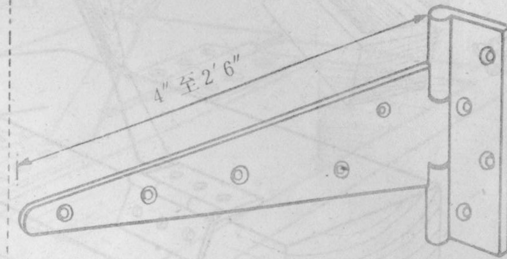
背合页



用于某些开合工件，如这种折迭桌

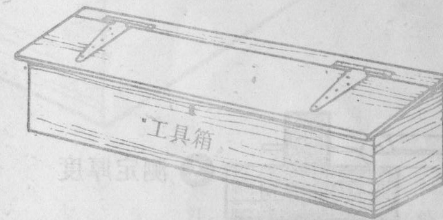


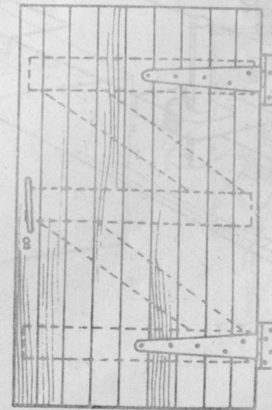
T型合页



用于铰接大的不涂漆表面

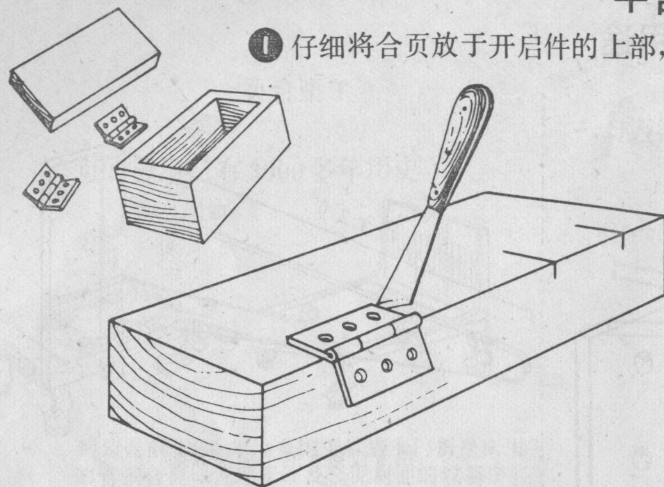
例如



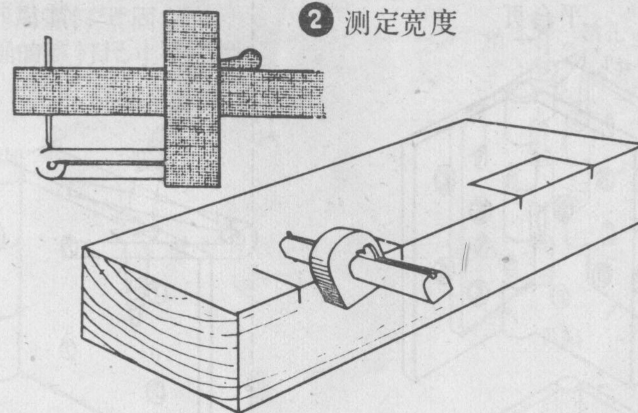


平合页的安装与固定方法：1

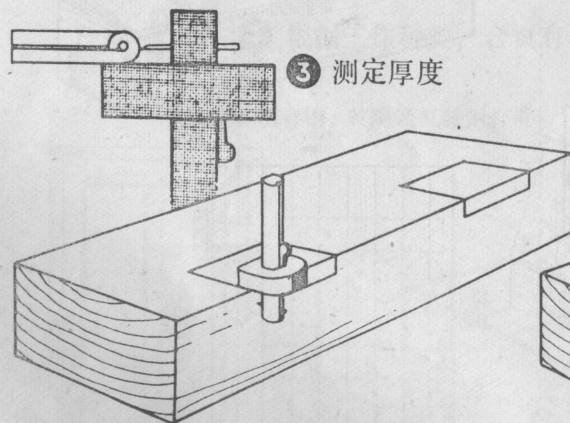
❶ 仔细将合页放于开启件的上部，沿合页边划线



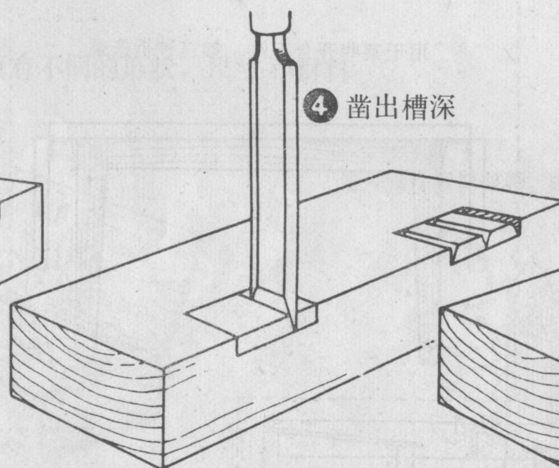
❷ 测定宽度



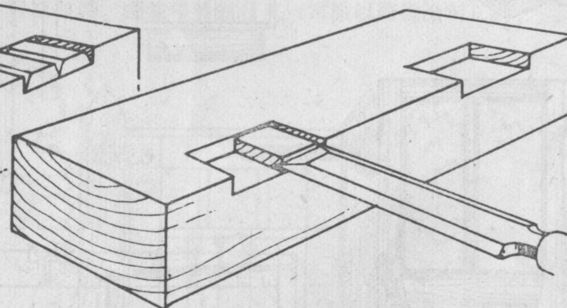
❸ 测定厚度



❹ 凿出槽深

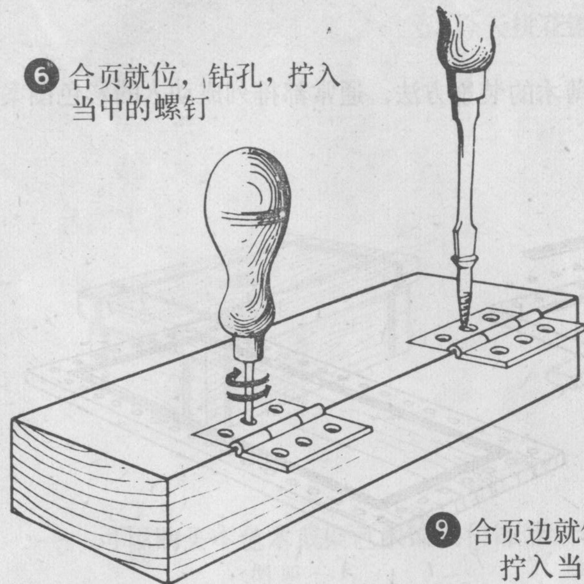


❺ 小心剔除



平合页的安装和固定方法：2

❻ 合页就位，钻孔，拧入当中的螺钉



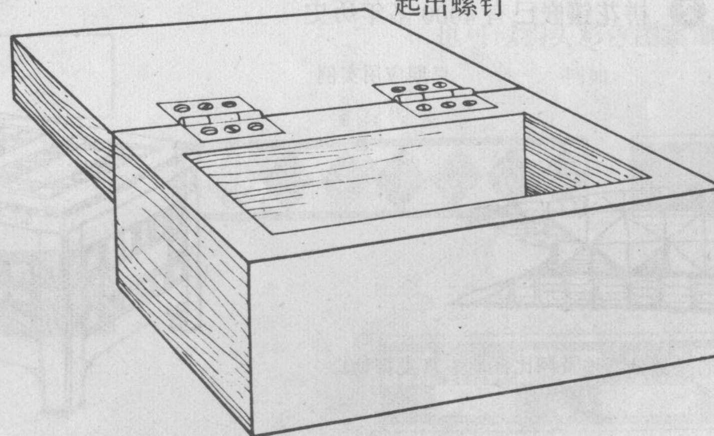
❼ 小心入位，沿合页边划线



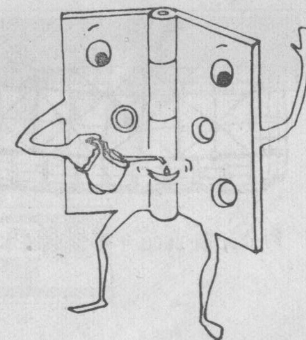
❾ 合页边就位，钻孔，拧入当中的螺钉

❿ 如需校正，起出螺钉

❽ 重复测定（②及③）及剔槽（④及⑤）作业

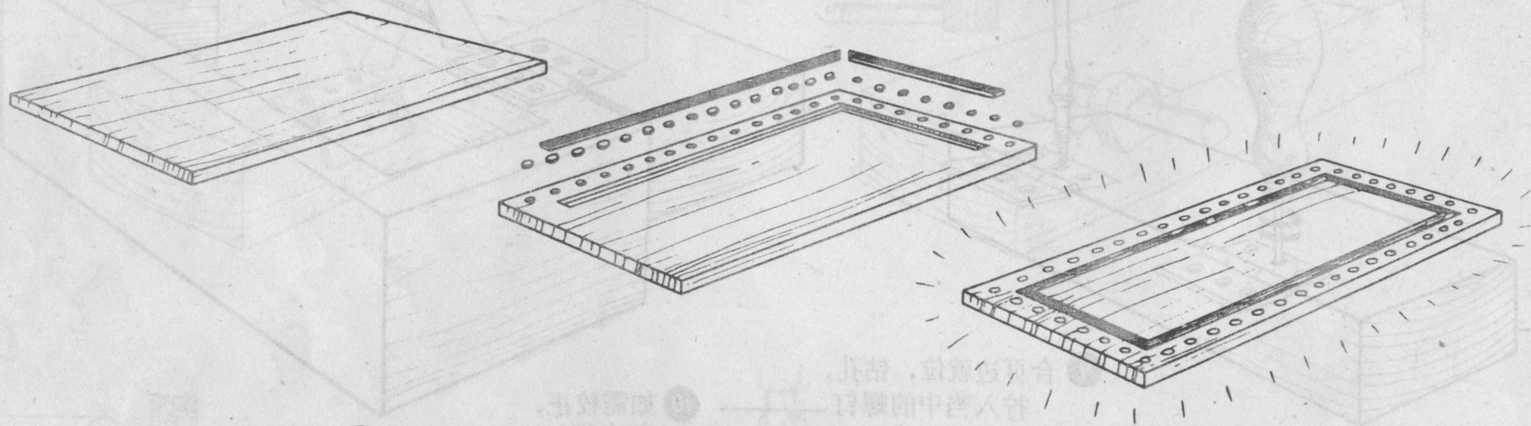


注：不时浇油，大有好处



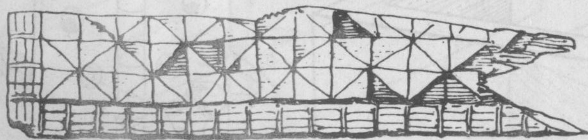
拼花镶嵌入门：1

❶ 拼花镶嵌是往木材表面银嵌珍贵金属、玻璃、彩釉、象牙或木材细条或薄木的装饰方法，通常都排列成动人的彩色图案

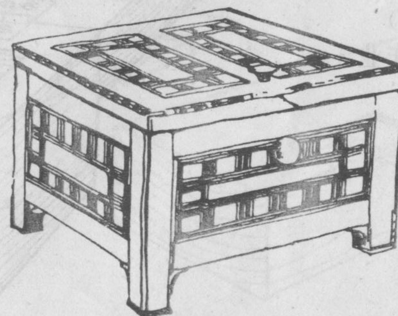


❷ 拼花镶嵌已有4000多年历史

早期应用实例



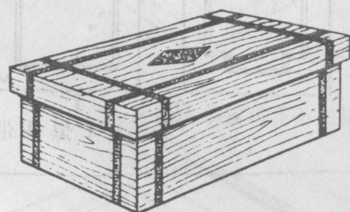
约公元前2900年彩釉镶嵌木箱的一部分（埃及阿比都斯王墓发掘物）



约公元前1250年用象牙和兰釉板镶嵌的小乌木盒（埃及底比斯墓葬）

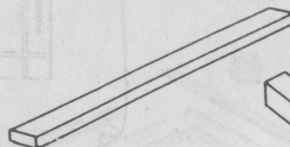
拼花镶嵌入门：2

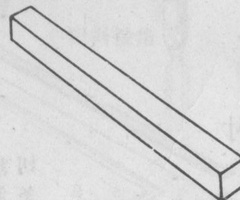
今天拼花镶嵌一般采用机器加工的木条，这种木条通称饰线和饰带



饰线

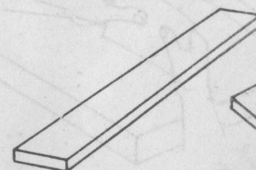
宽 1/32″至 3/16″

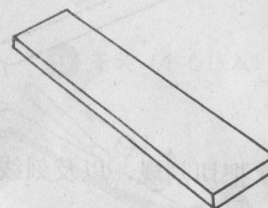




饰带

宽 3/16″至 3/4″

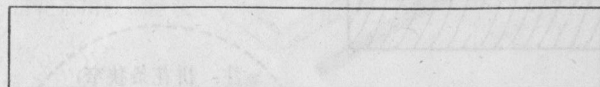




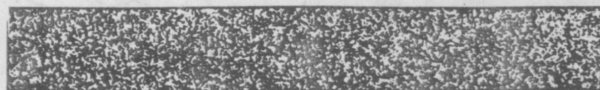
可以购买本色木或染色木饰线和饰带

例如

埃及榕饰带（市售白色饰带）



染成黑色的埃及榕饰带（市售黑色饰带）



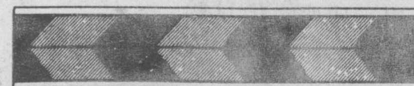
也可以购买彩色图案饰带

例如

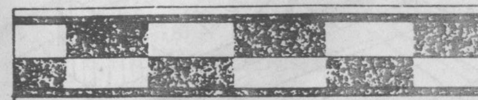
宝石图案



鲱鱼骨图宽

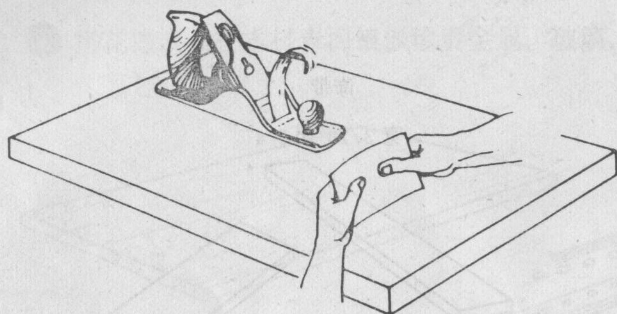


方格图案

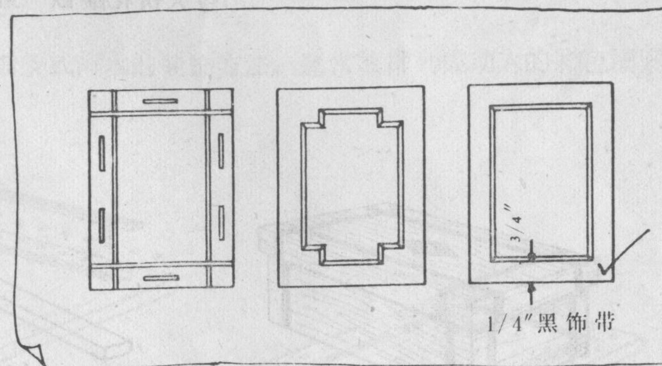


拼花镶嵌的准备工作

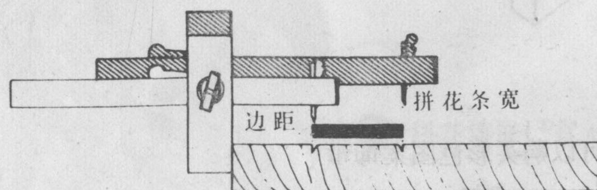
❶ 修整表面

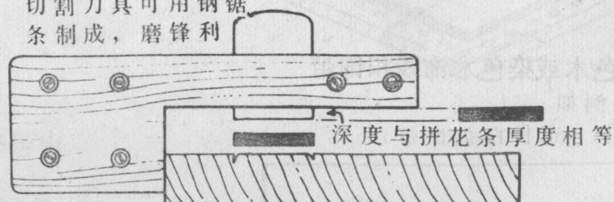


❷ 在纸上草拟并构想各种拼花图案

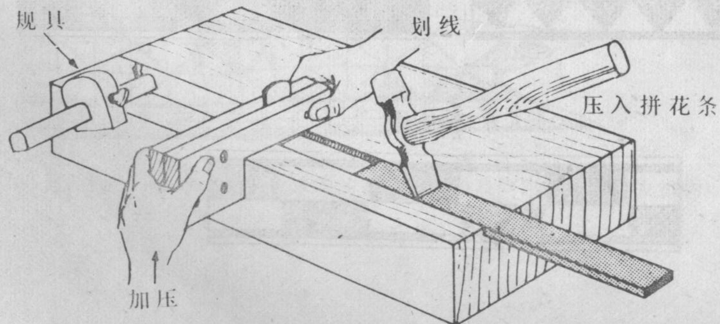


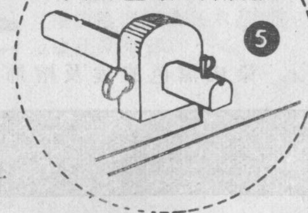
❸ 把切割规，以及刻线杆调到规定的尺寸





❹ 用一块废木板试验



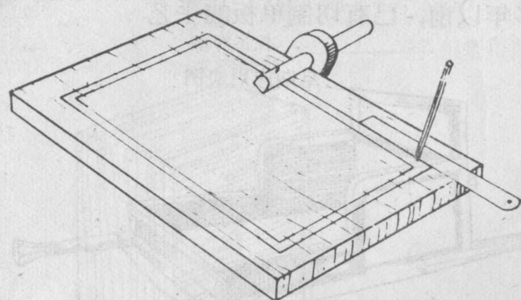


❻ 必要时调节规具及刻线杆的尺寸

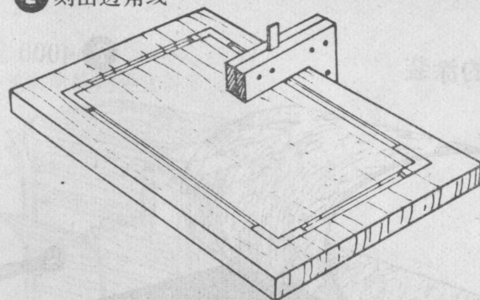


拼 花 镶 嵌

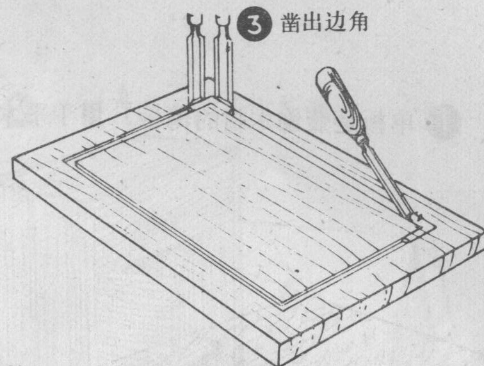
（介绍的方法包括板成型）



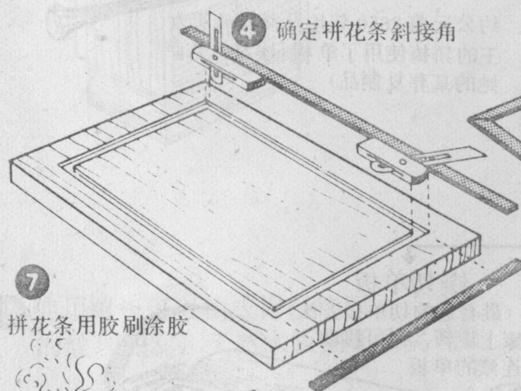
❶ 用规具找出中心，用铅笔画出边角



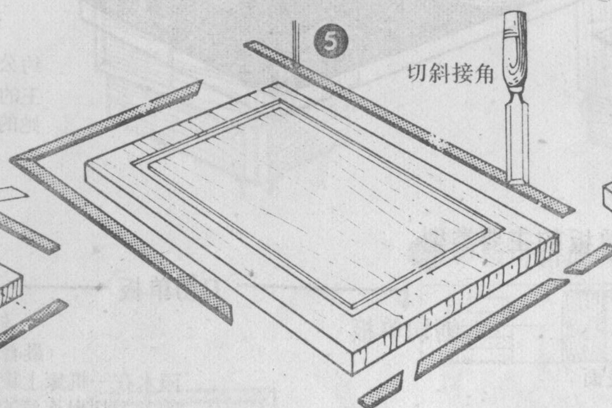
❷ 刻出边角线



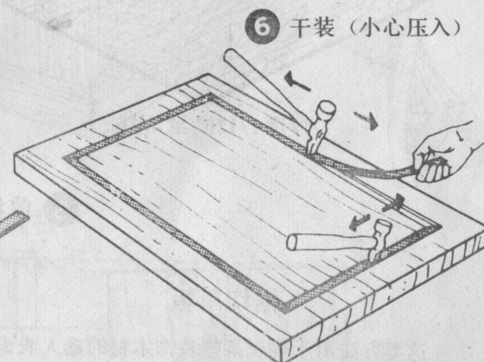
❸ 凿出边角



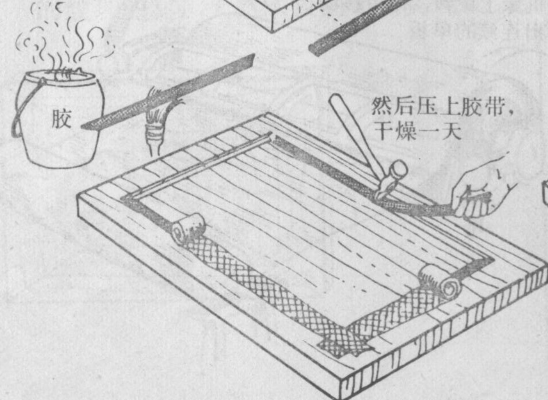
❹ 确定拼花条斜接角



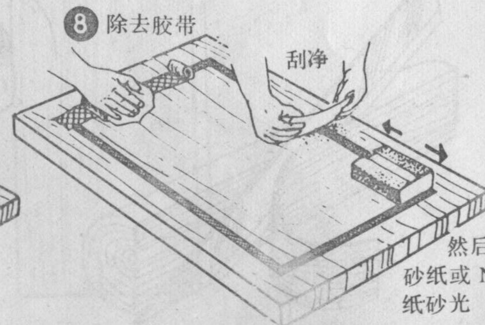
❺ 切斜接角



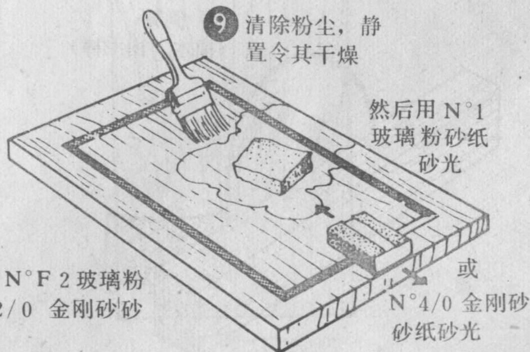
❻ 干装（小心压入）



❼ 拼花条用胶刷涂胶



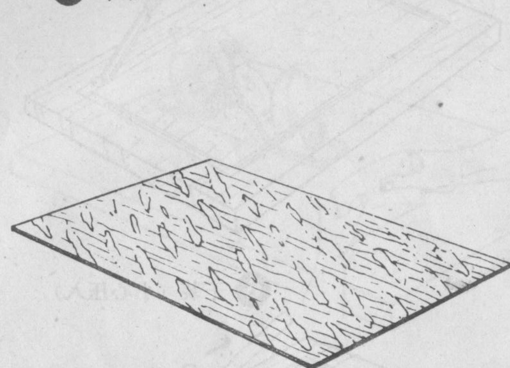
❽ 除去胶带

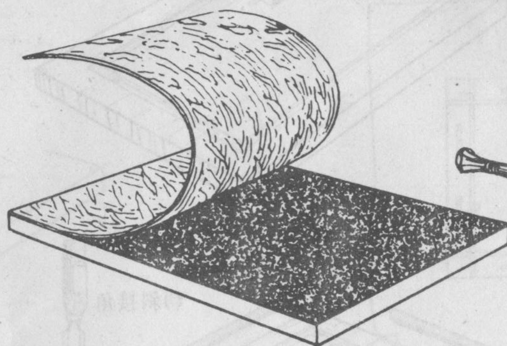


❾ 清除粉尘，静置令其干燥

单 板 入 门

❶ 单板是装饰木材的薄板，用于平木板的涂装

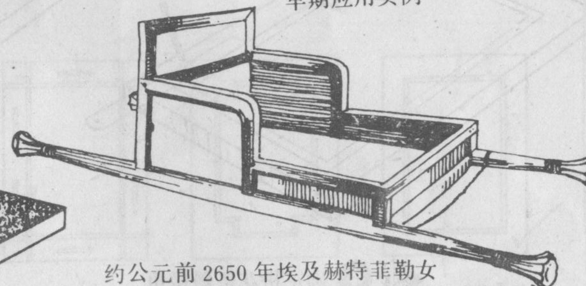




厚度1/120″至3/16″

❷ 4000多年以前，已有切制单板的手艺

早期应用实例



约公元前2650年埃及赫特菲勒女王的轿椅使用了单板（埃及、吉萨她的墓葬复制品）

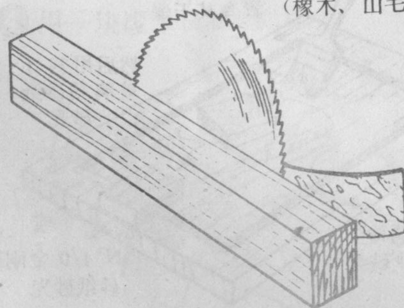
❸ 单板的主要类型

刀切单板

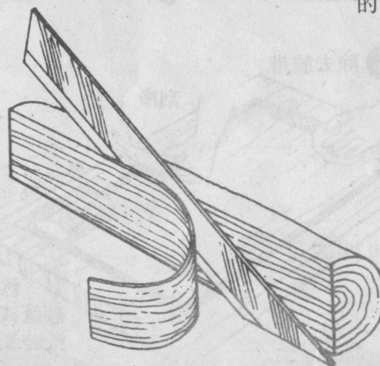
锯切单板

这类方法用于展现某些装饰木材的动人表面

例如（橡木、山毛榉）



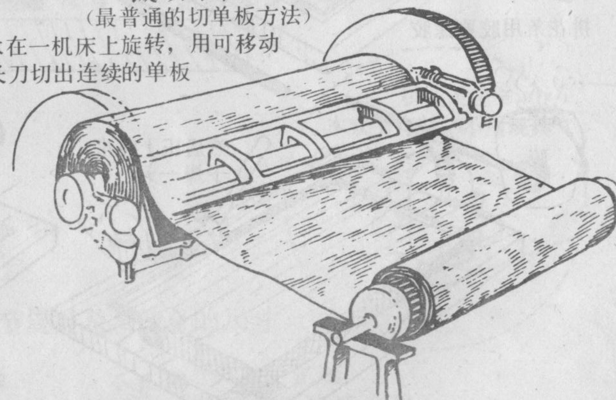
刨切单板

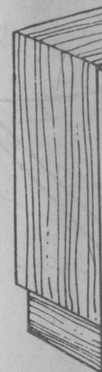


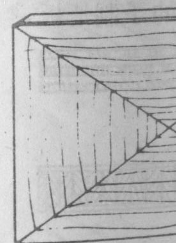
镟切单板

（最普通的切单板方法）

园木在一机床上旋转，用可移动的长刀切出连续的单板





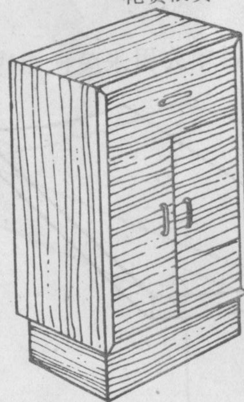


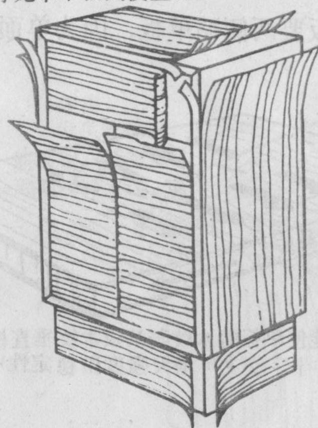
❶ 使用单板可

❸ 使用单板可的纹理图案

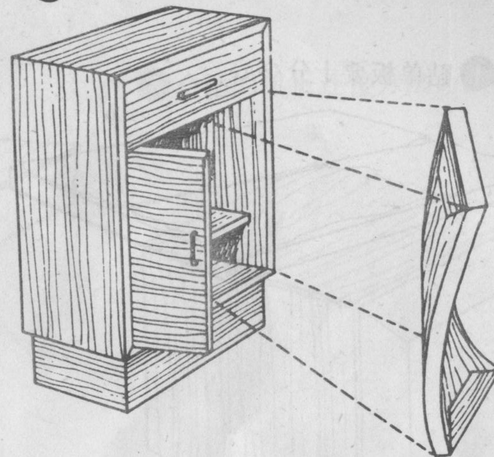
使用单板的好处

❶ 使用单板可以制得较便宜的装饰表面

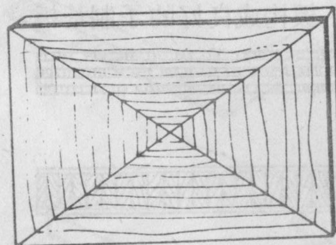




❷ 单板有助于防止木板翘曲

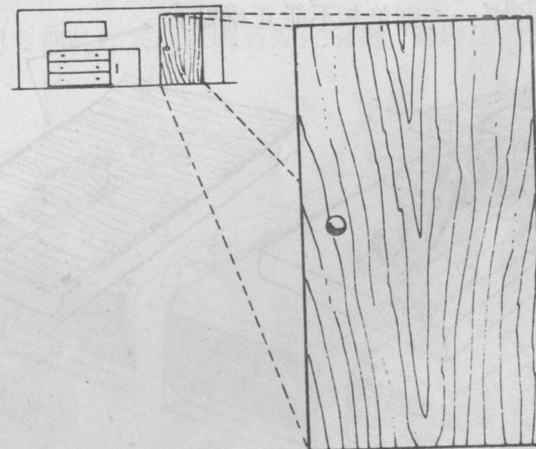


❸ 使用单板可以构成许多艳丽的纹理图案，天然木板则无法实现



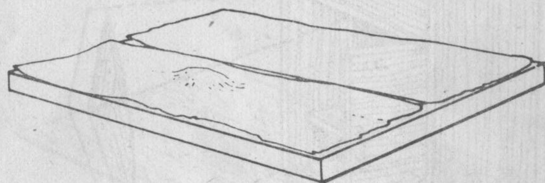


❹ 单板可拼成大板

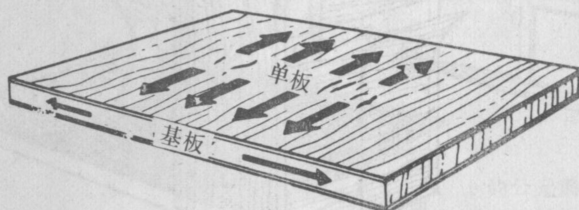


简要说明

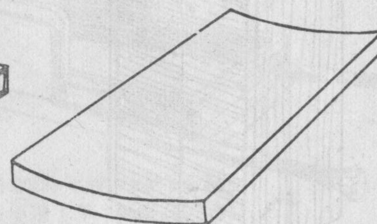
❶ 贴单板要十分小心



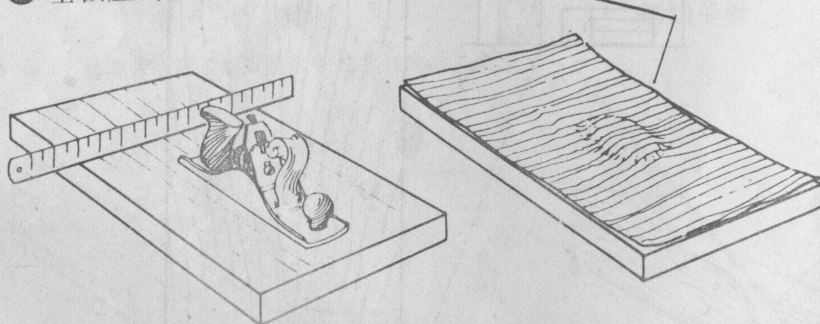
❷ 一块木板要两侧贴单板，因为单面贴会使木板弯曲



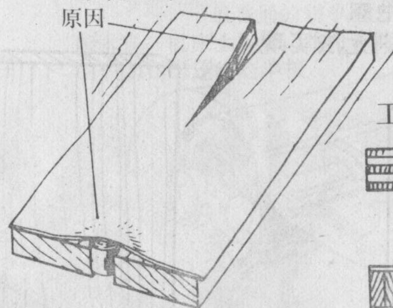
尽可能使单板的木纹与基板木纹垂直相交
（十字交叉可增大强度和稳定性）



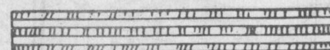
❸ 基板应当修平，否则单板不能正确贴合



❹ 尽力避免使用有节或环裂的木板



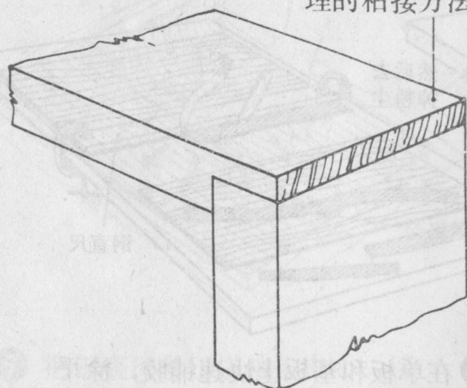
❺ 胶合板或细木工板构成良好的予制基板



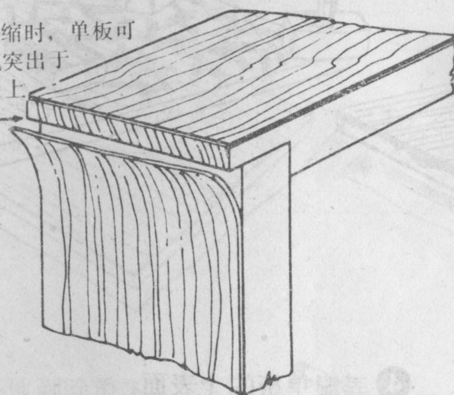


简要说明

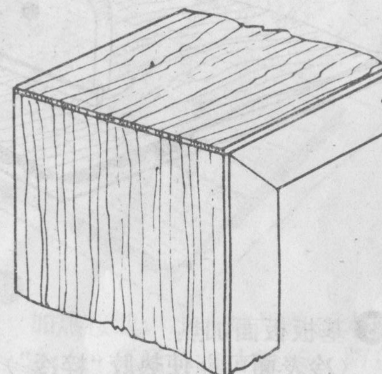
❻力求避免采用在单板下面露出端面纹理的粘接方法



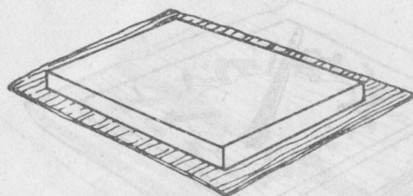
理由
发生收缩时，单板可能破裂，或突出于端面纹理之上

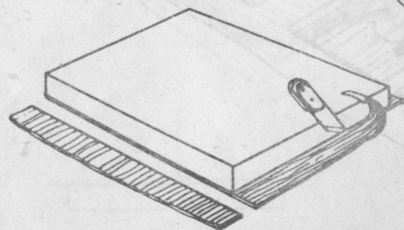


❼合适的单板连接方法为斜接



❽切单板时要留出加工余量，等胶干以后再切边

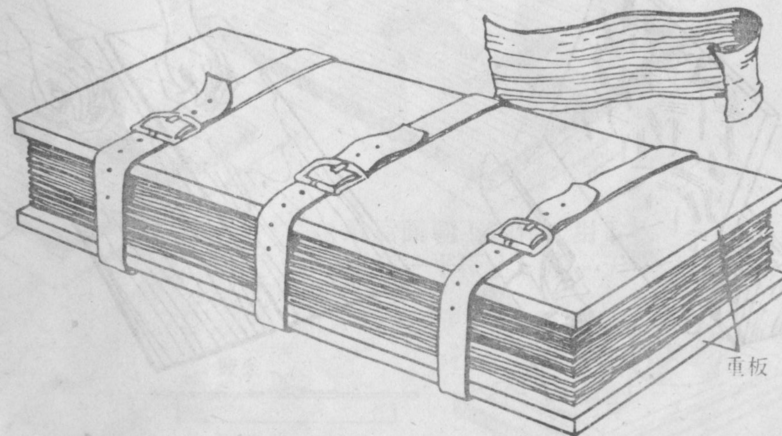




❾适合切割单板的刀具可用钢锯条制得



❿单板不用时要捆扎起来，否则将发生扭曲，有时还会退色

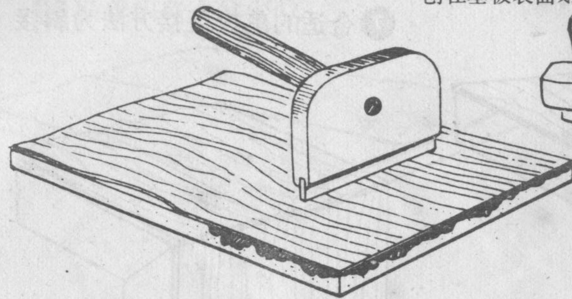


木 锤 镶 面：1

供中型拼接工件镶面的困难方法（图示的方法包括拼接）

入门

此法是使用单板木重加压，赶出多余的胶和空气的方法



❶ 准备工作

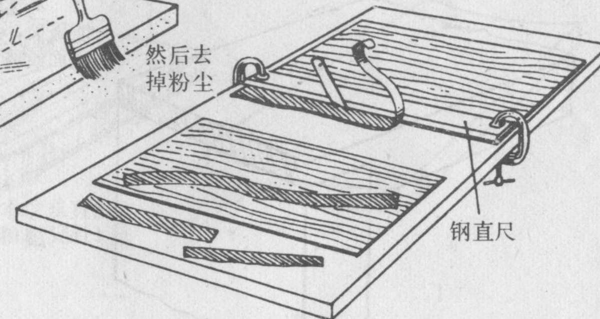
在需要处修平基板，用锯齿刨在基板表面划痕，以便挂胶

用 N°1 玻璃粉砂纸或 N°4/0 金刚砂砂纸轻轻打磨

然后去掉粉尘

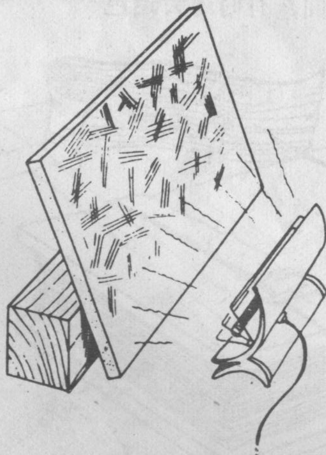


❷ 把单板铺到一块细木工板上，使其木纹吻合，切去多余部分，留出 1″ 余量作搭接用

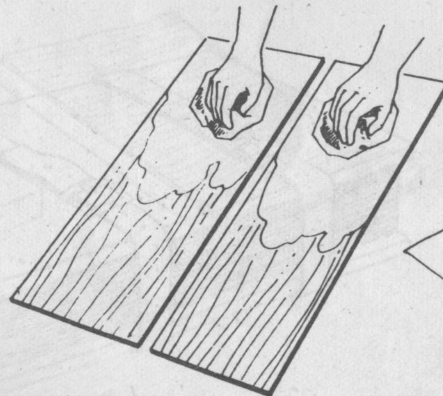


❸ 基板板面加热

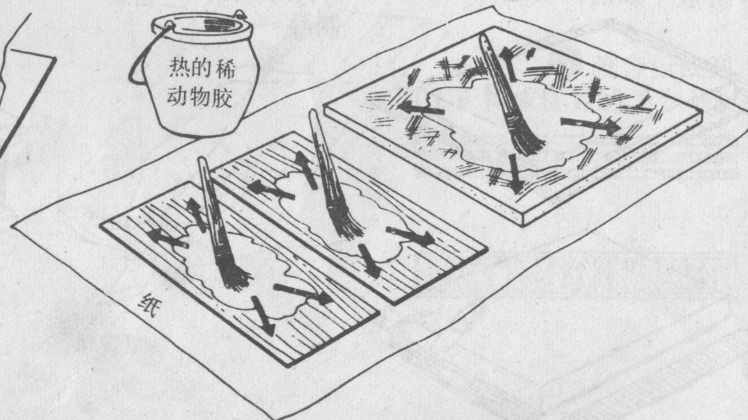
（冷表面可能使热胶“粹冷”）

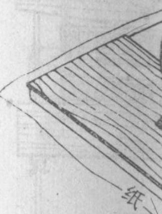


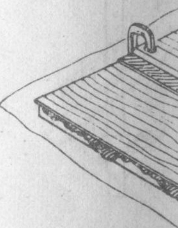
❹ 弄湿单板的上表面，防止涂热胶时卷缩



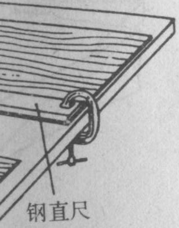
❺ 在单板和基板上快速铺胶，涂平



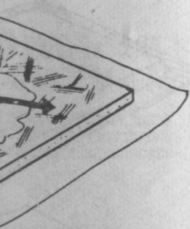




到一块细木
使其木纹吻
去多余部分，
余量作搭接用



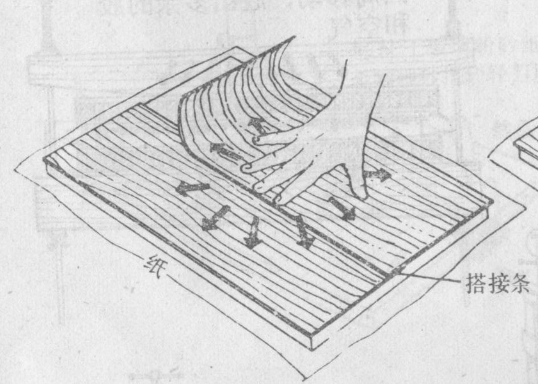
胶，涂平



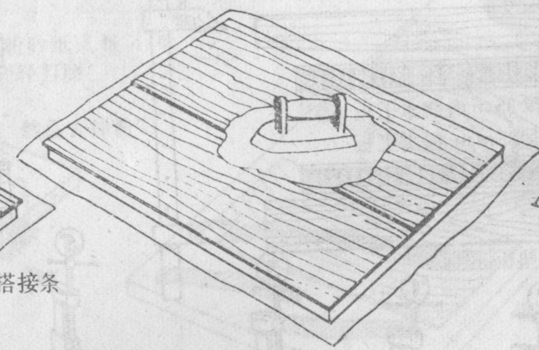
木锤镶面：2

供中型拼接工件镶面的困难方法（图示方法包括拼接）

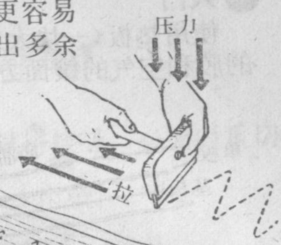
❻ 小心地将单板铺到基板上，用手掌加压，自中心向四边把多余的胶和气泡赶出



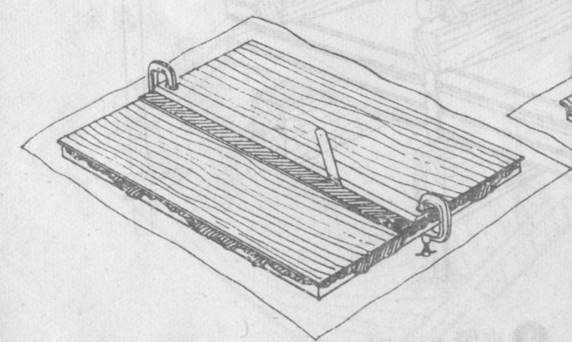
❼ 然后用热平熨斗，垫一湿布，加热单板下面的胶



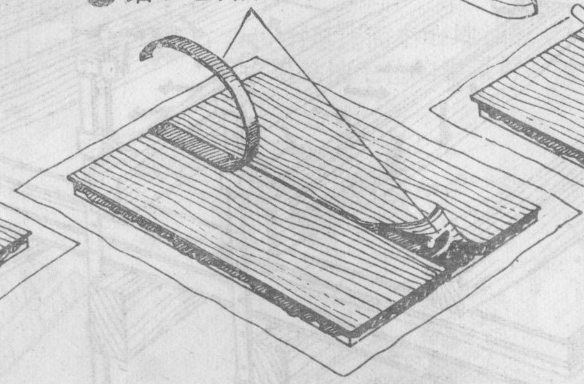
❽ 用平熨斗加热胶时，更容易用单板木锤进一步赶出多余的胶和气泡



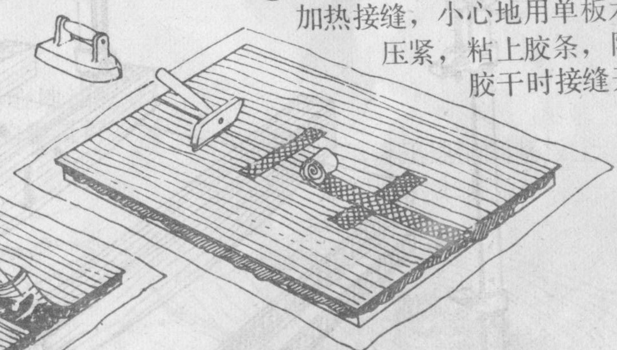
❾ 把钢直尺紧压搭接条中心，切割，割至在基板上刻出细线



❿ 细心地剥除废条

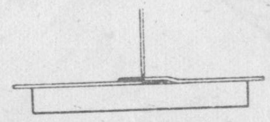


⓫ 加热接缝，小心地用单板木锤压紧，粘上胶条，防止胶干时接缝开胶



⓬ 最后面朝下翻转，用重物压在一平板上，压一天







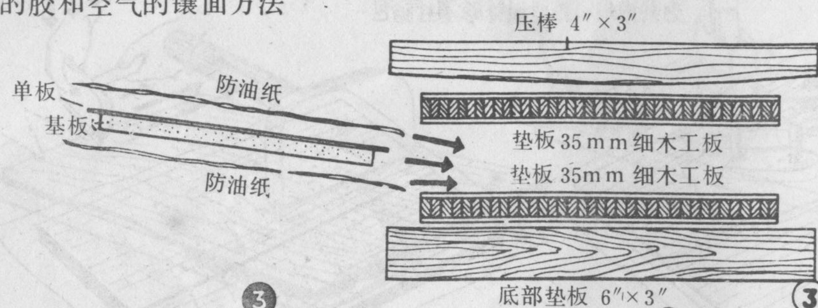


垫板镶面

供大中型件镶面的相当简单的方法
（图示的方法包括拼接）

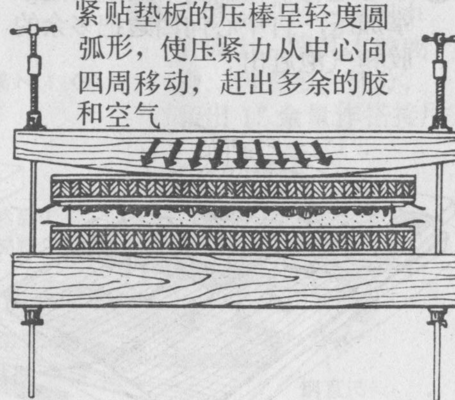
❶ 入门

使用垫板（一块大板），压棒和夹具重压挤出多余的胶和空气的镶面方法



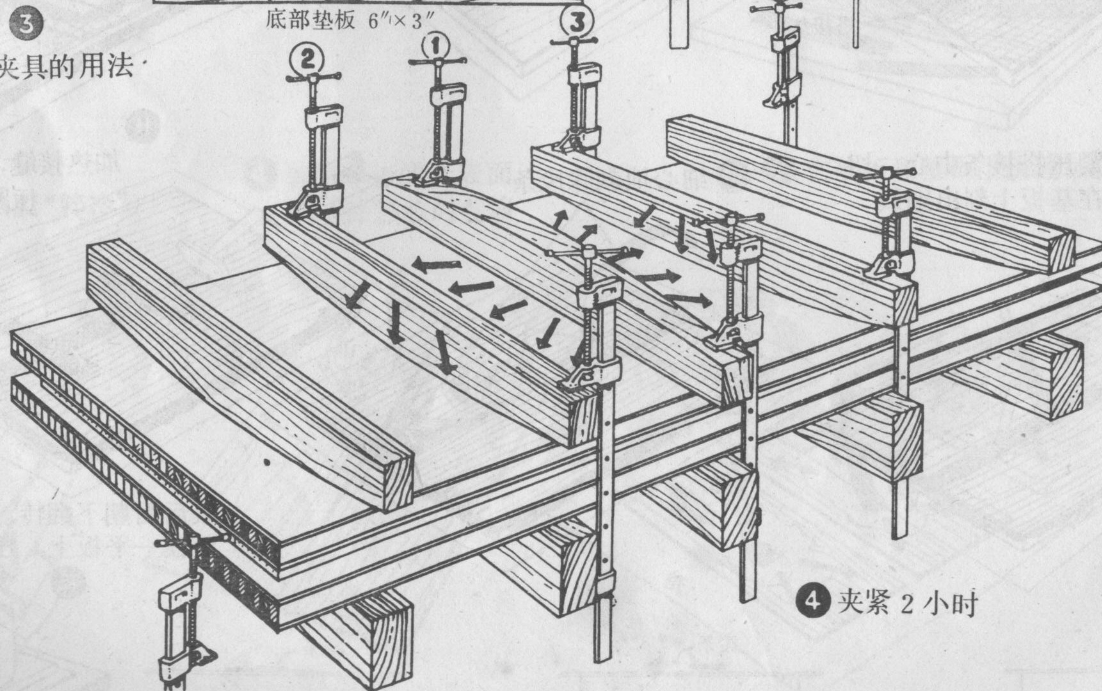
❷ 注：

紧贴垫板的压棒呈轻度圆弧形，使压紧力从中心向四周移动，赶出多余的胶和空气



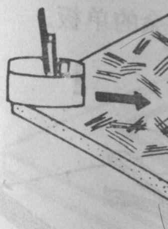
❸ 夹具的用法



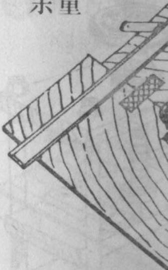


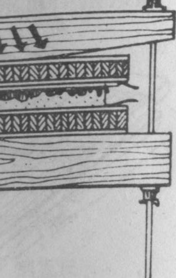
❹ 夹紧 2 小时

❶ 在需要处…
表面划痕…



❹ 然后校好，…
开胶，然后…
余量






呈轻度圆
从中心向
多余的胶

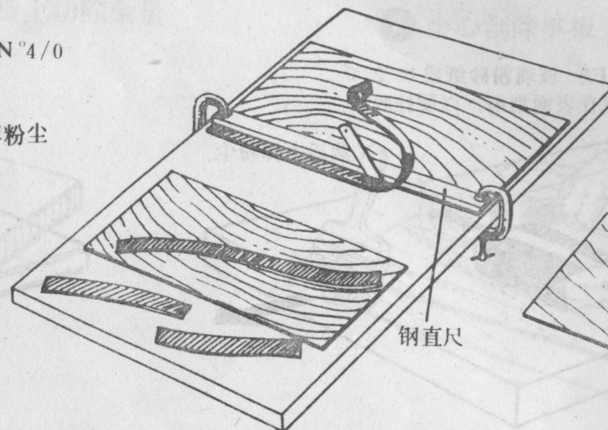
垫板镶面

供大中型工件镶面的相当简单的方法
（图示的方法包括拼接）

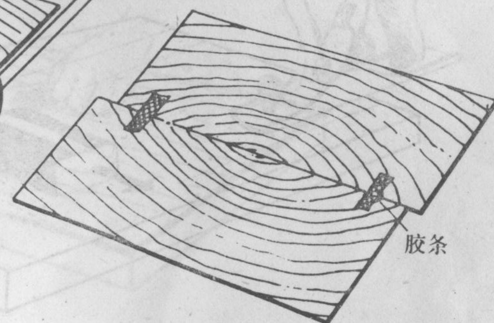
❶ 在需要处修平基板，用锯齿刨使基板表面划痕，以便挂胶



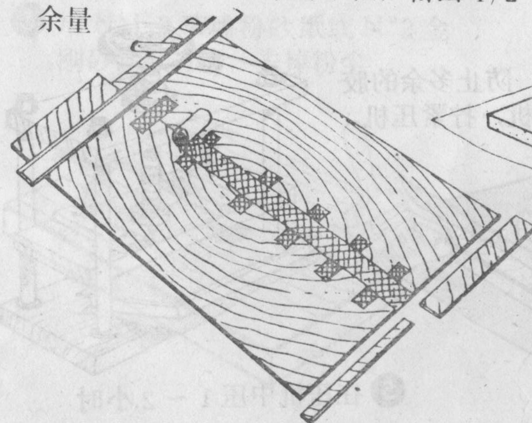
❷ 把单板铺到一块细木工板上，使其木纹吻合，切出接缝



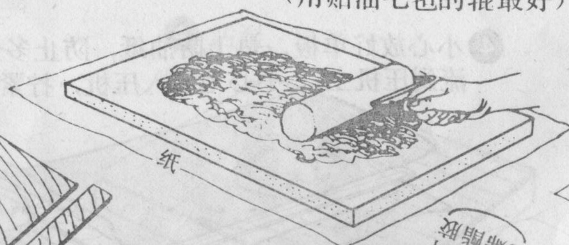
❸ 试拼接缝，必要时重切



❹ 然后校好，粘上胶条，防止干燥时接缝开胶，然后切去多余的单板，留出 1/2″ 余量

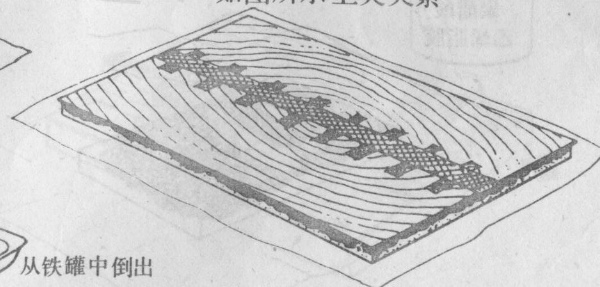


❺ 在基板上迅速而小心地铺胶（用贴油毛毡的辊最好）





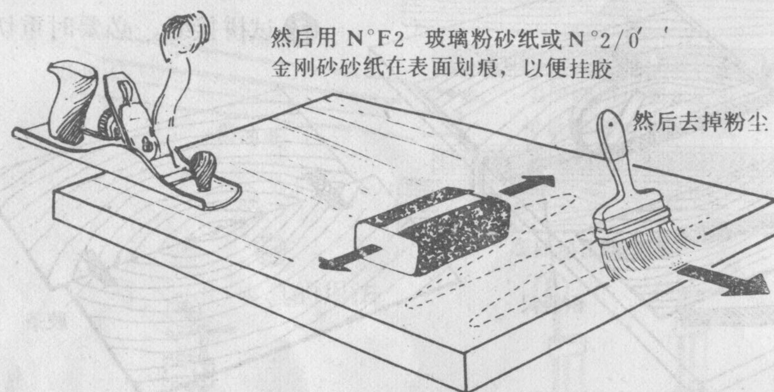
❻ 把单板迅速铺到基板上，如图所示上夹夹紧



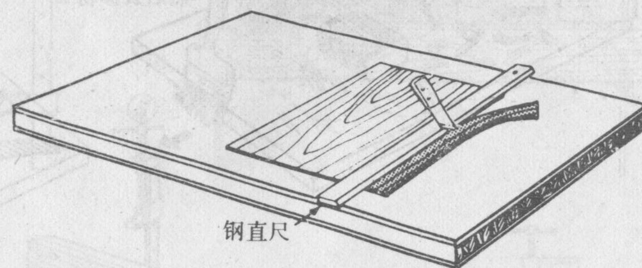
小型压机镶面

（使用小型压机对小型工件镶面的简单的方法）

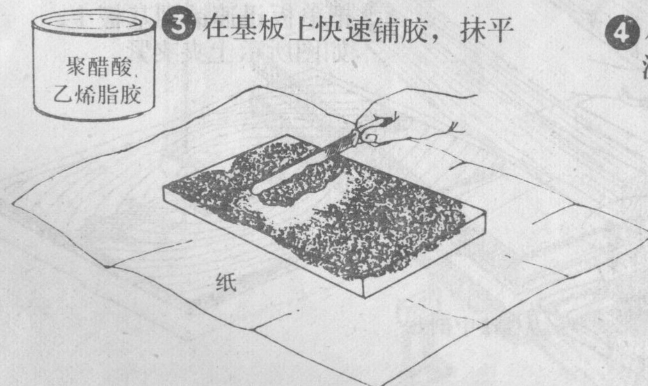
❶ 在需要处修平基板



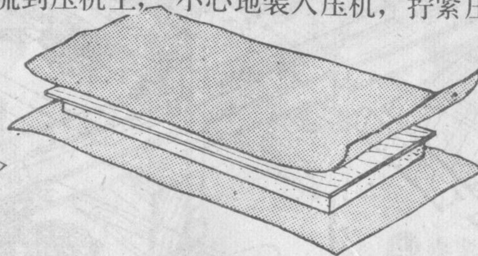
❷ 在一块细木工板上切除多余的单板，留 1/2″ 余量

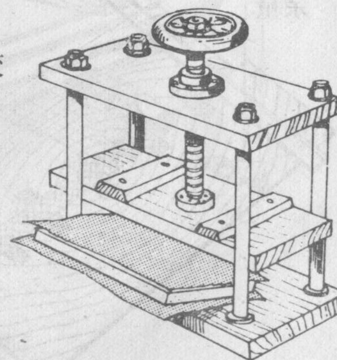


❸ 在基板上快速铺胶，抹平



❹ 小心放好单板，垫上防油纸，防止多余的胶流到压机上，小心地装入压机，拧紧压机





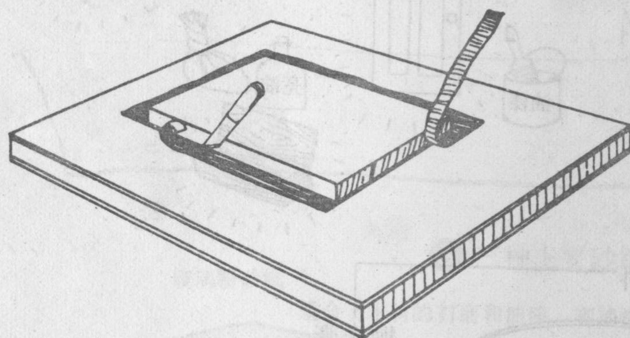
❺ 在压机中压 1～2 小时

多余的单板，

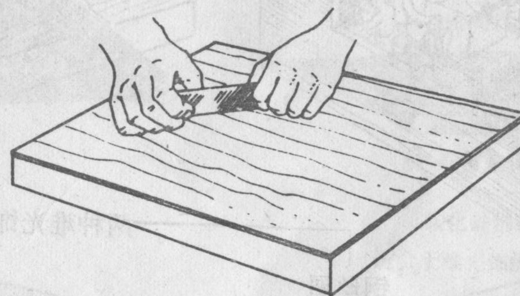
～2小时

如何清理单板

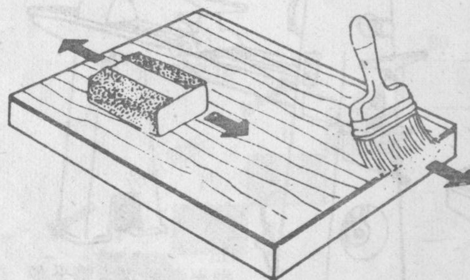
❶ 单板镶面工件放置一天以后，在细木工板上切除余量



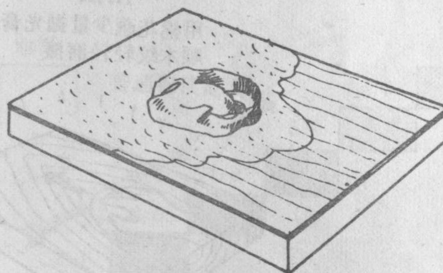
❷ 小心刮除单板上的胶（记住单板的厚度）



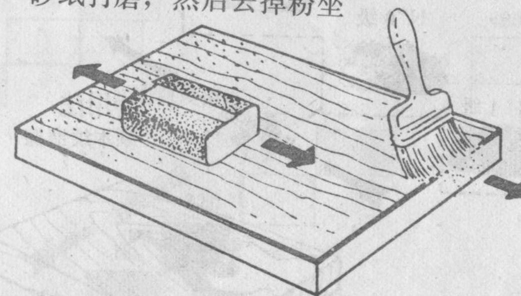
❸ 用 N°F 2 玻璃粉砂纸或 N°2 金刚砂砂纸打磨，去掉粉尘



❹ 沾湿、凉干



❺ 用 N°1 玻璃粉砂纸或 N°4 金刚砂砂纸打磨，然后去掉粉尘

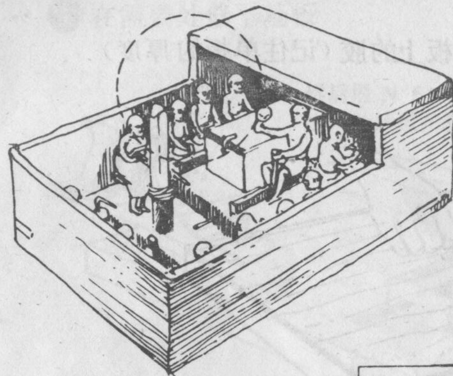


磨 料 入 门

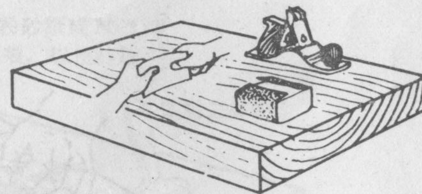
❶

磨料的应用已有 4000 多年历史

下图所示为一木工作坊模型，使用细粒砂石打磨木材（公元前 2100 年埃及底比斯麦凯特来墓）



❷ 现在有各种类型的磨料供木材磨光、供油漆、亮油及涂纤维素清漆涂层整平用





❸

两种难光饰的表面整平用磨料

钢丝屑

钢丝屑是用高强度钢丝制成的

普通分级范围



用法

顺木纹磨擦

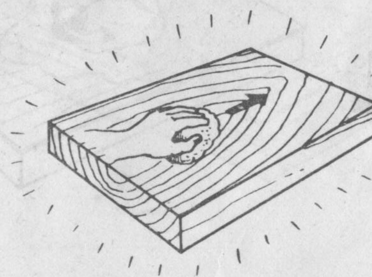
抛光膏

抛光膏由细磨料粉和适当的溶剂制成



用法

用棉花蘸少量抛光膏，顺木纹轻轻磨擦





注：抛光膏适宜于整平多种机床加工的工件饰面（不留擦痕）

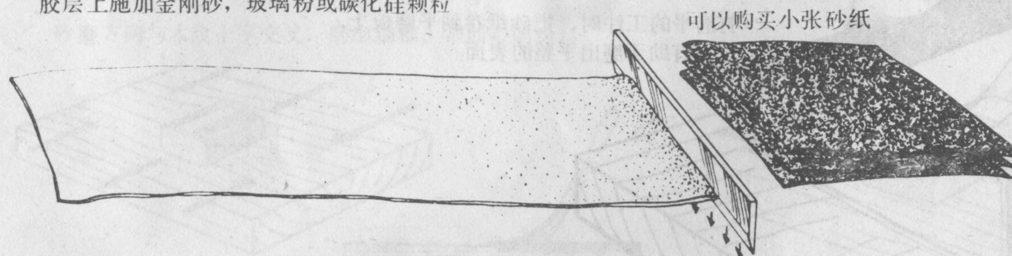
光膏适宜于整平多
床加工的工件饰面
擦痕）

砂　纸

（玻璃粉砂纸，金刚砂砂纸，碳化硅砂纸）

❶ 生产过程

在结实的纸、布或二者组合层上涂上一层胶，胶层上施加金刚砂，玻璃粉或碳化硅颗粒



❷ 两种砂粒排列方法

开敞式

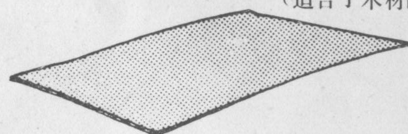
（砂粒间隔排列）

密闭式

（砂粒密集排列）

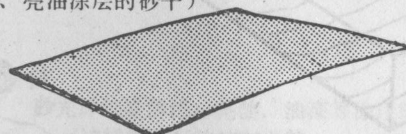
❸ 三种主要砂纸

玻璃粉砂纸



金刚砂砂纸

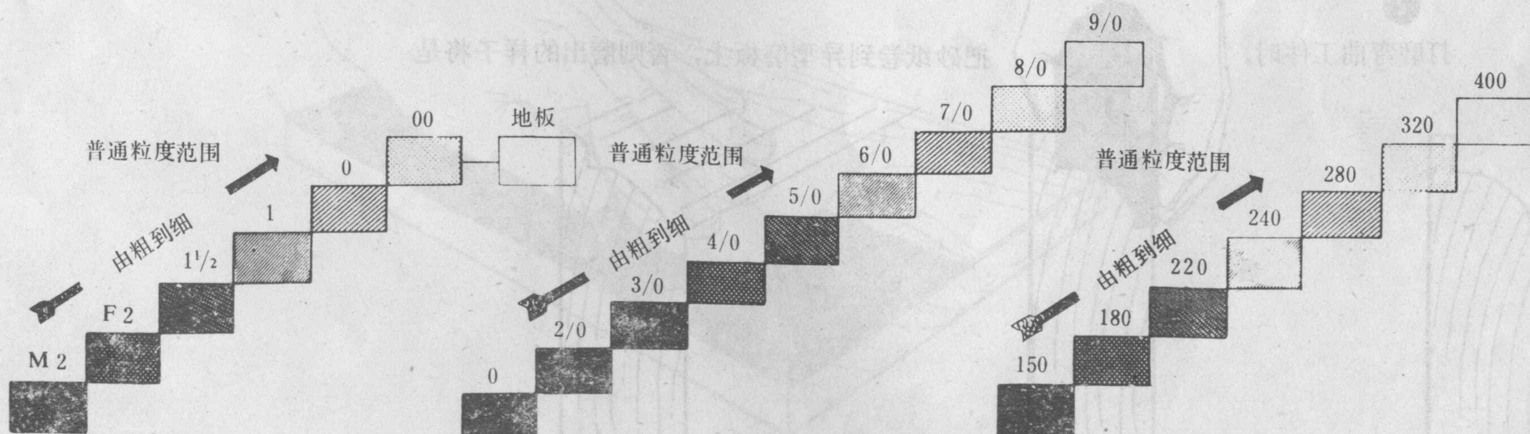
（适合于木材的打磨和油漆、亮油涂层的砂平）



碳化硅细砂纸

（适合于难光饰的清漆的砂平）





砂 纸 用 法: 1

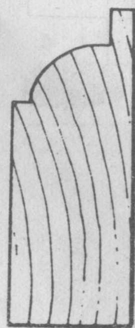
❶ 打磨木材



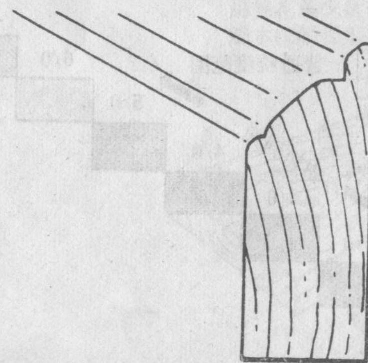
打磨平的工件时，把砂纸卷到平磨板上，这样有助于磨出平整的表面

❷

打磨弯曲工件时，把砂纸卷到异型磨板上，否则磨出的样子将是



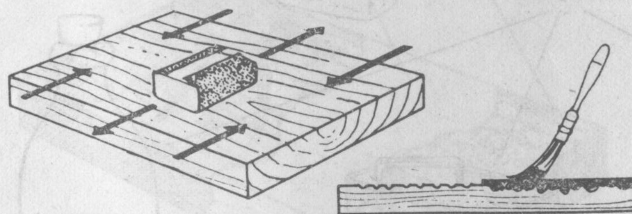




砂 纸 用 法：2

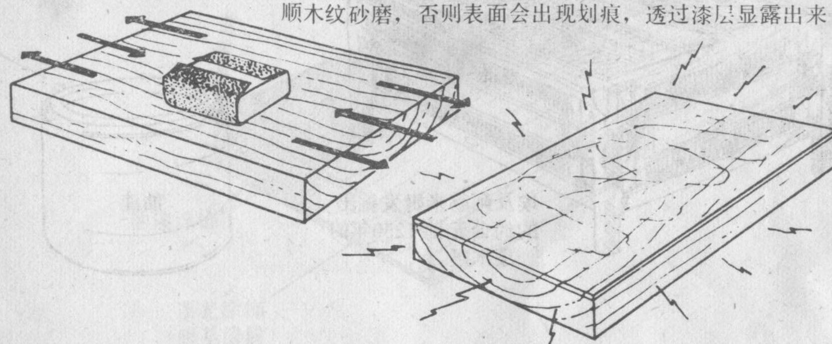
❸ 涂油漆时的砂磨方向

砂磨方向与木纹十字交叉，磨出细槽，帮助吸附涂料



❹ 涂罩光漆时的研磨方向
（涂亮油、纤维素清漆等）

顺木纹砂磨，否则表面会出现划痕，透过漆层显露出来



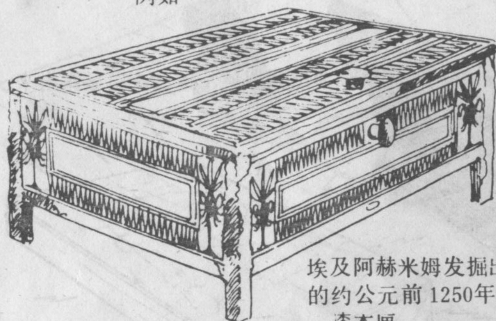
❺ 注
砂光纤维素清漆、亮油、油漆等涂层时，只用指尖压住砂纸
（这样能更好地控制平整）



涂饰入门

❶ 某些涂饰已有数千年历史

例如

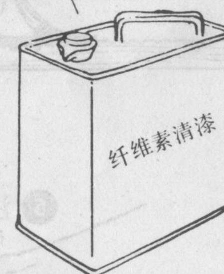


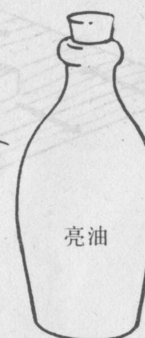
埃及阿赫米姆发掘出的约公元前1250年的漆木匣

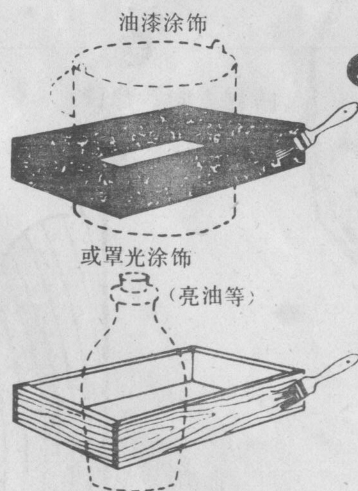
❷ 现在使用的一些涂饰种类



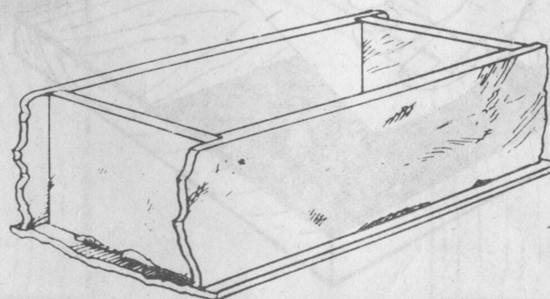


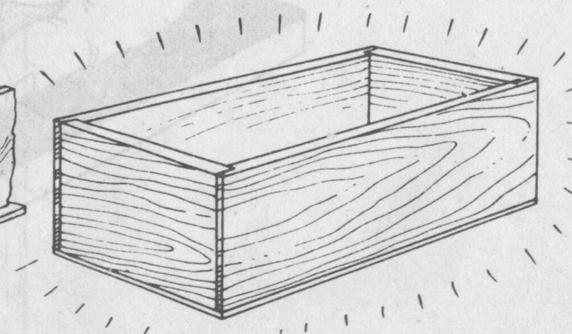






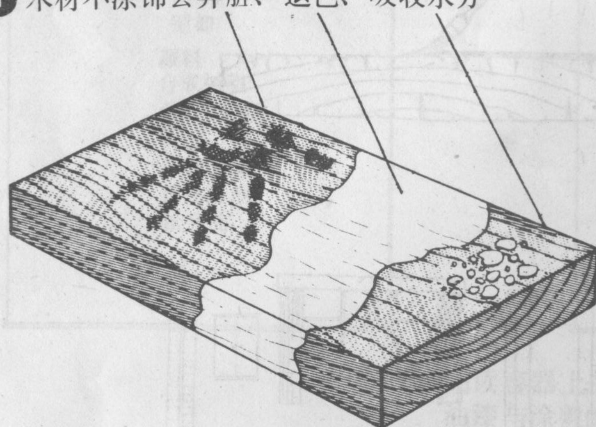
❸ 不论采用何种涂饰方法，加工件必须清理干净



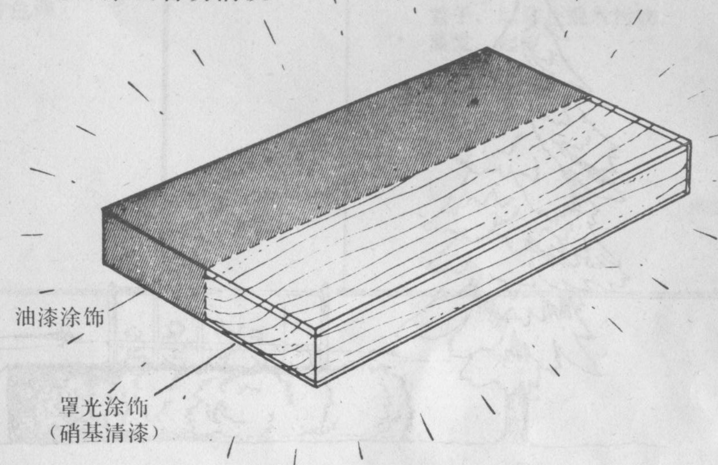


进行涂饰的理由

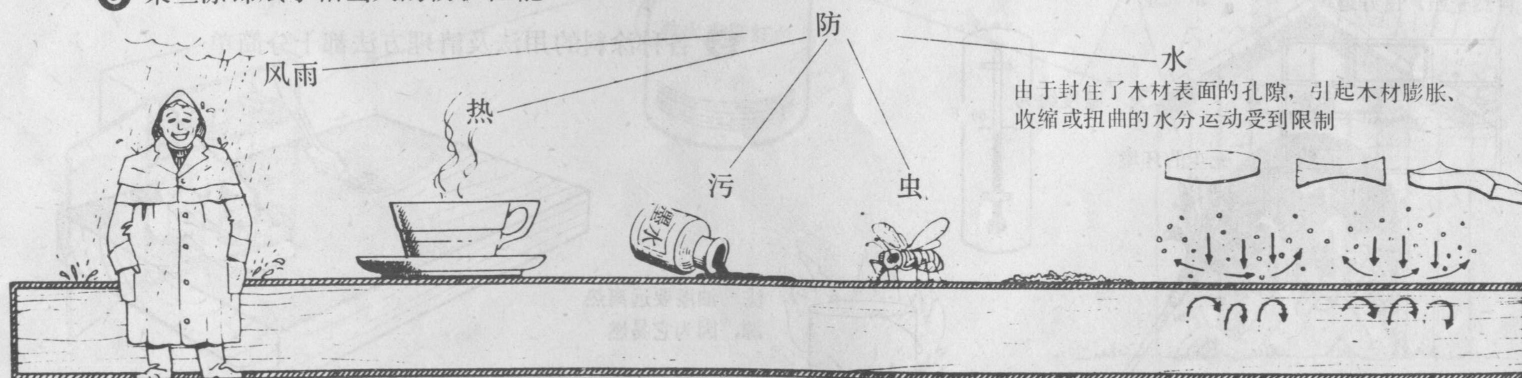
❶ 木材不涂饰会弄脏、退色、吸收水分



❷ 木材涂饰为它提供清洁美观的防护性涂层，这种涂层容易清洗

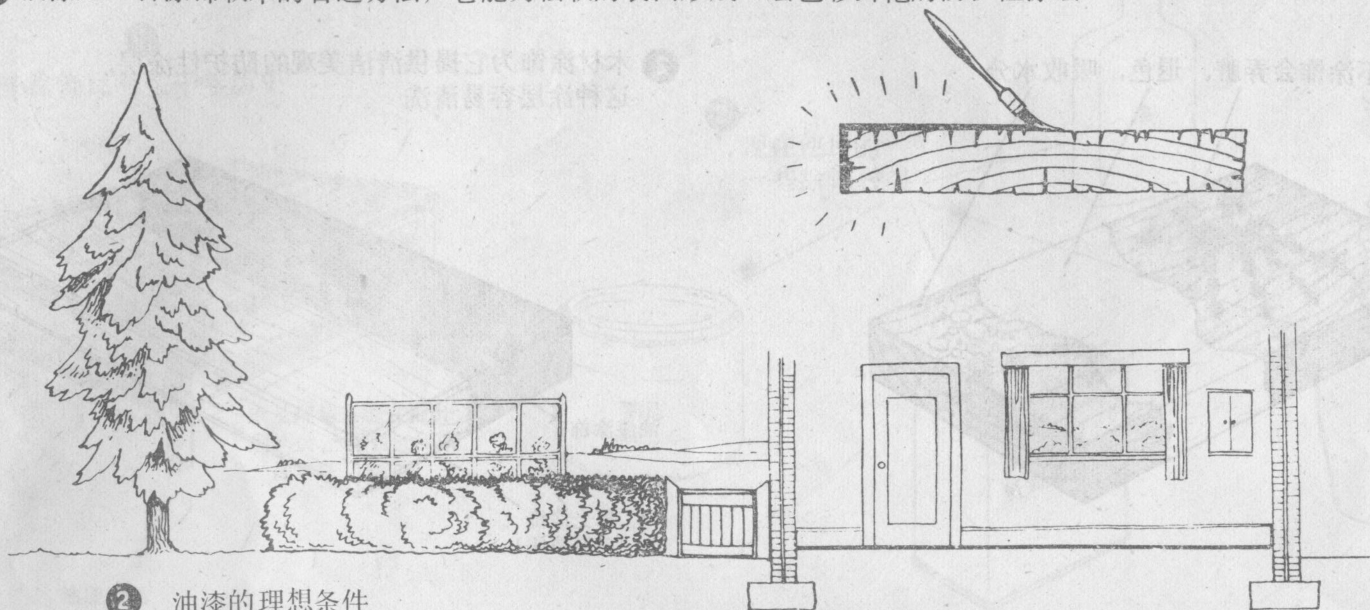


❸ 某些涂饰赋予相当大的防护性能

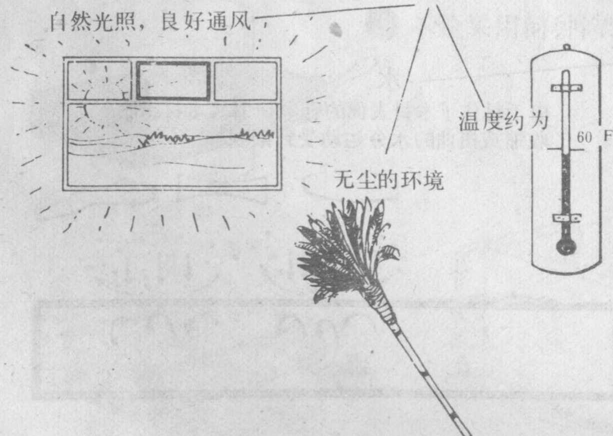


油 漆 入 门:1

❶ 油漆是一种涂饰软木的普通方法，它能为松软的表面形成一层色彩鲜艳的防护性涂层

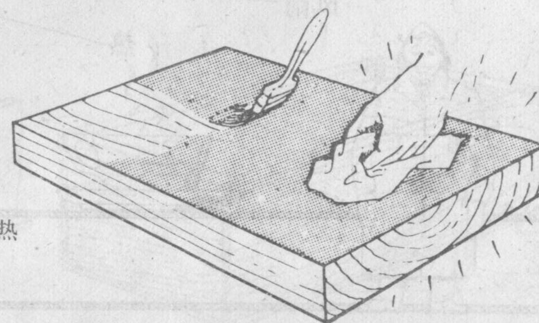


❷ 油漆的理想条件



注　油漆要远离热源，因为它易燃

❸ 各种涂料的用法及清理方法都十分简单



油漆入门：2

❹ 油漆有许多种，它们是由各种原料制成的，例如

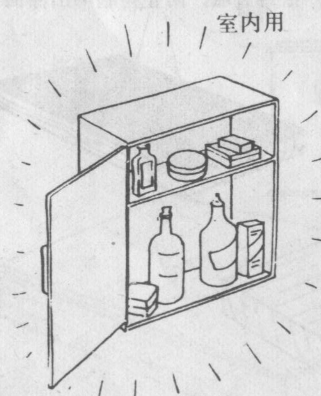
- 颜料
- 合成树脂
- 天然树脂
- 桐油
- 亚麻子油
- 石油溶剂
- 松节油

❺ 油漆可以制成各种颜色，各种色调

❻ 储存注意事项

容器经常保持清洁，盖紧盖子，以防止混入污物、蒸发、起皮

❼ 阅读容器上的说明，确保油漆与涂敷的工件相符

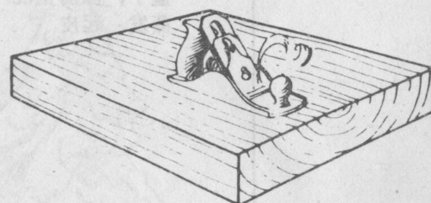






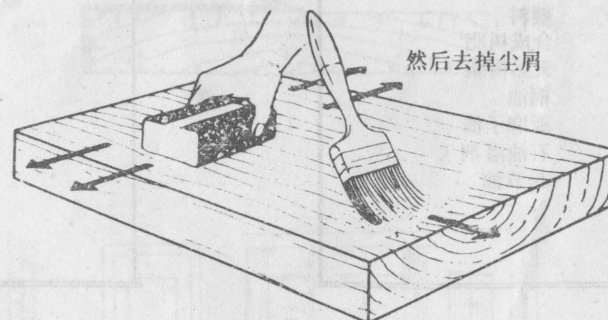
油漆的表面准备工作

❶ 刨平



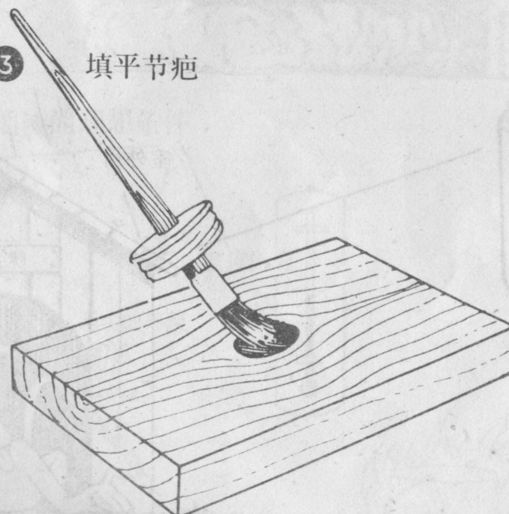
❷ 磨光

N °M2 级玻璃粉砂纸或 N°0 级金刚砂砂纸

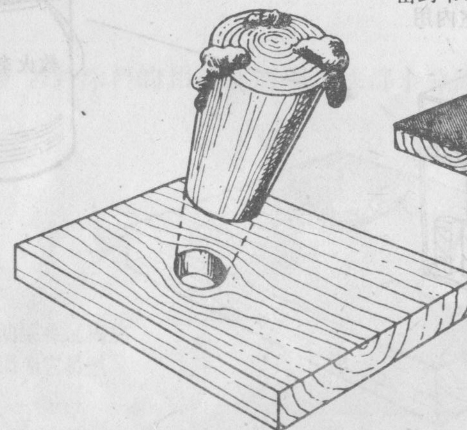


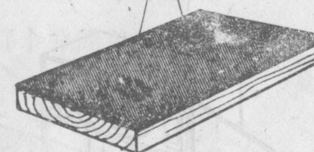
❸ 填平节疤





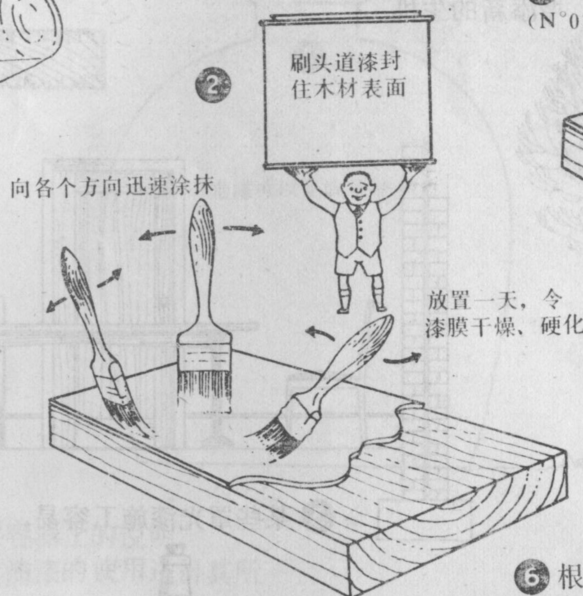
使用填节剂的理由

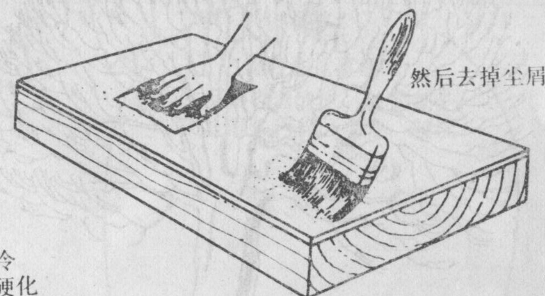


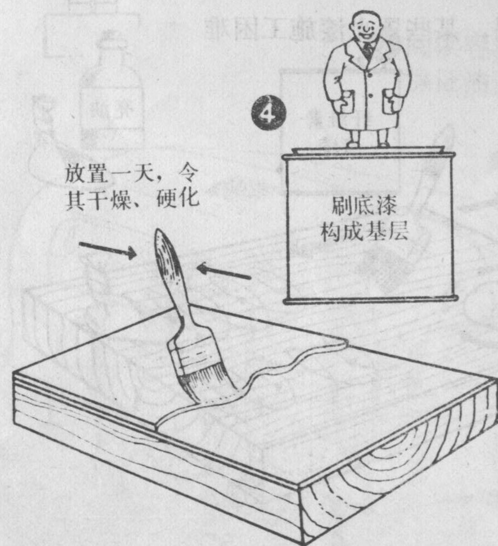


油 漆 涂 法

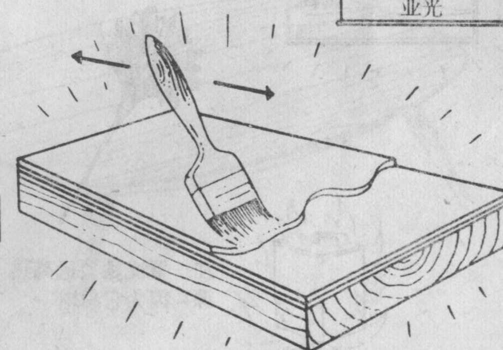

1
永远要在油漆锅内调匀，只有在必要时才加入适当的稀料


2
刷头道漆封住木材表面
向各个方向迅速涂抹
放置一天，令漆膜干燥、硬化


3 砂光
（N°0级玻璃粉砂纸或N°6级金刚砂砂纸）
然后去掉尘屑


4
刷底漆构成基层
放置一天，令其干燥、硬化


5 轻轻砂光
（N°00级玻璃粉砂纸或N°7/0级金刚砂砂纸）
然后去掉尘屑


6 根据涂饰要求涂最后一道漆
亮光
或
柔光
或
亚光

罩光漆入门:1

❶ 罩光漆是涂饰硬木的普通方法，它固定在硬木的密实表面上，形成保护性漆膜，给纹理、颜色和图案增添新的生机





❷ 罩光漆的理想条件

自然光照，良好的通风



无尘的环境

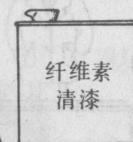


温度约为 60°F

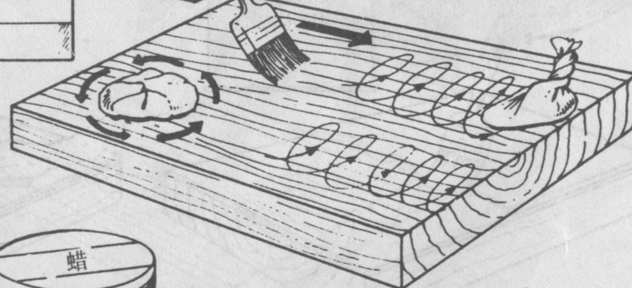


❸ 某些罩光漆施工容易，某些罩光漆施工困难







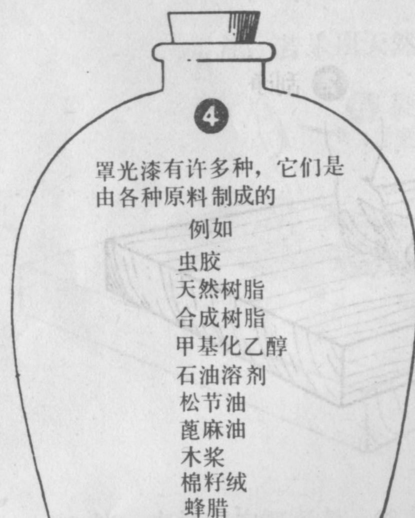




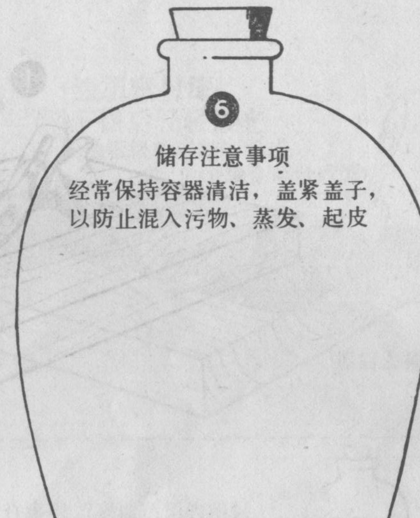


注：罩光漆要远离热源，因为它易燃

罩光漆入门: 2.

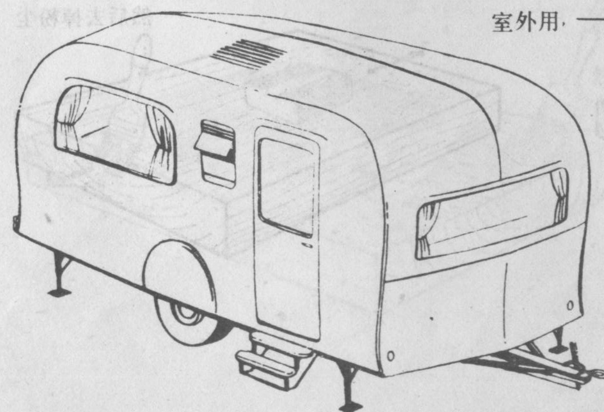






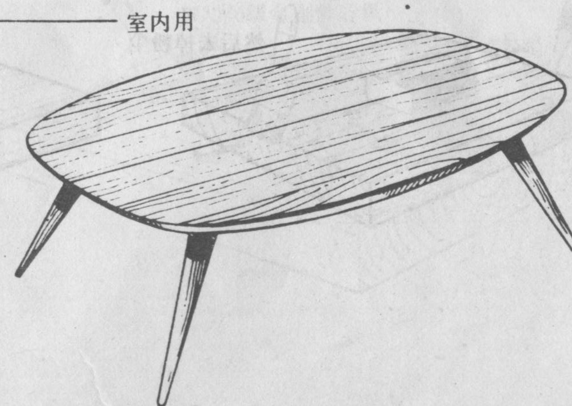
❼阅读容器上的说明
保证油漆的使用适得其所

室外用



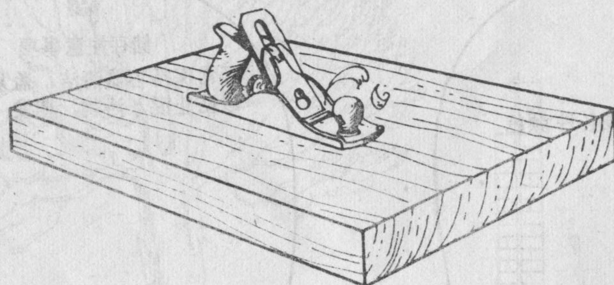


室内用

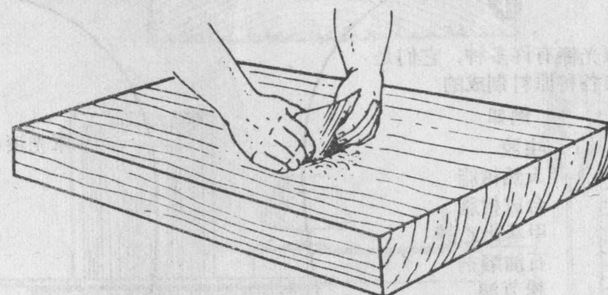


罩光漆的表面准备工作: 1

❶ 刨平

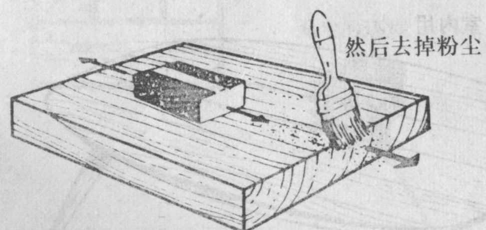


❷ 刮净



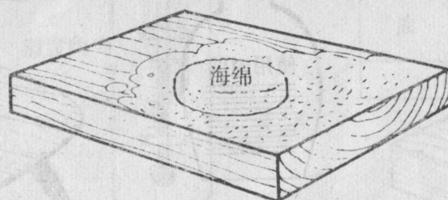
❸ 磨光

（N°F2 级玻璃粉砂纸或N°2/0 级金刚砂砂纸）



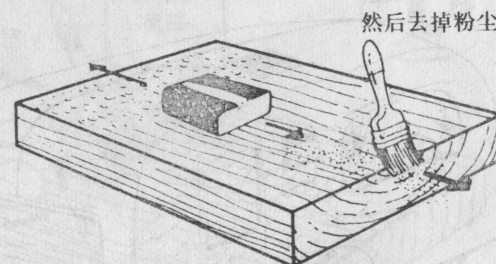
❹ 浸湿

（使松纤维竖起，令其干燥）



❺ 磨光松纤维

（N°1级玻璃粉砂纸或N°4/0级金刚砂砂纸）

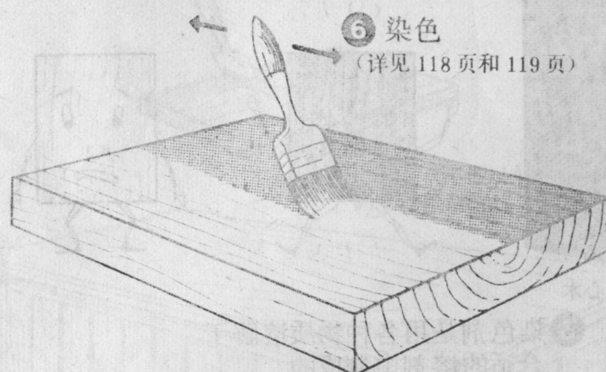


罩光漆的表面准备工作：2

注：若采用天然本色涂饰，则省去 N°⑥和 N°⑦

⑥ 染色

（详见118页和119页）



⑦ 涂用密封漆，干燥后轻轻砂光

（地板级玻璃粉砂纸或 N°9/0级金刚砂砂纸）

然后去掉粉尘



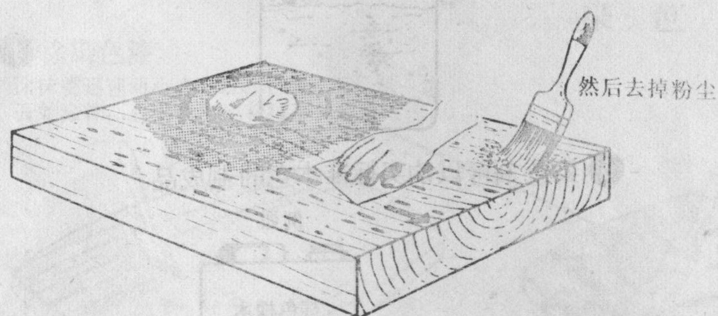
注：木材结构细密者，省去 N°⑧和 N°⑨

⑧ 填充　干燥后轻轻砂光

（详见120页和121页）

（地板级玻璃粉砂纸或 N°/9 级金刚砂砂纸）

然后去掉粉尘



许多种罩光漆适用的密封漆是 DE-WAXED亮油



⑨ 涂用密封漆，干燥后轻轻砂光

（地板级玻璃粉砂纸或 N°9/0级金刚砂砂纸）

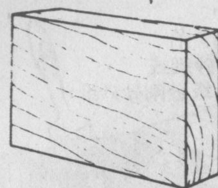
然后去掉粉尘

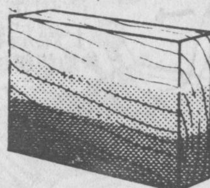


木材染色入门

❶ 染色的原因

加深木材颜色

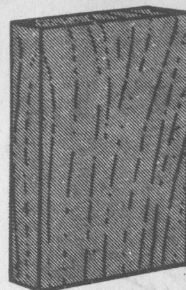




仿珍贵材

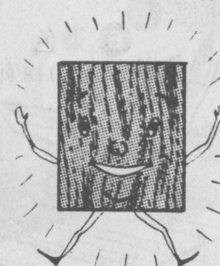


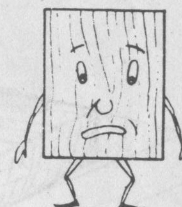
例如



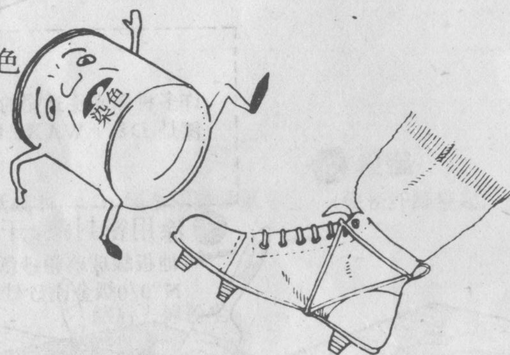
白梧桐　染成　桃花心木

给单调的木材增添新的生机





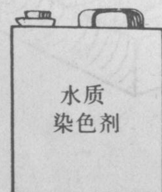
❷ 注:
有许多木材的本色很好，因此无需染色

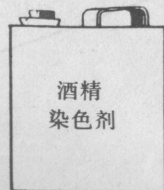


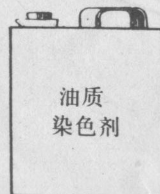
❸ 染色剂是用各种物质溶解于合适的溶剂中制成的



❹ 三种染色剂







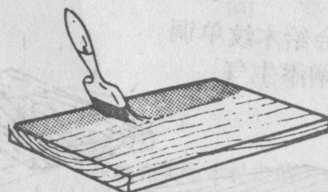
❺ 染色剂可以购买标准木色的制成品

例如

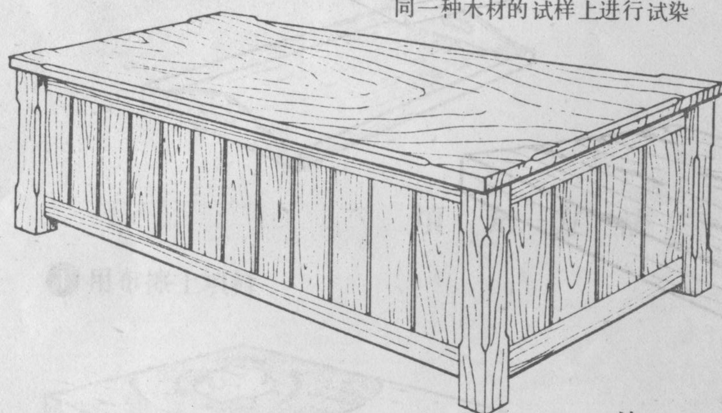


染 色 方 法

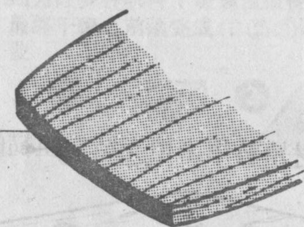
简 要 说 明

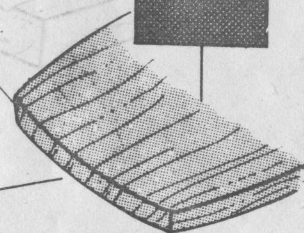


在实际染色以前，一定要在同一种木材的试样上进行试染



染色剂会使板边木纹颜色深于板面，为了使颜色均匀，板边木纹染色时染色剂浓度要减半

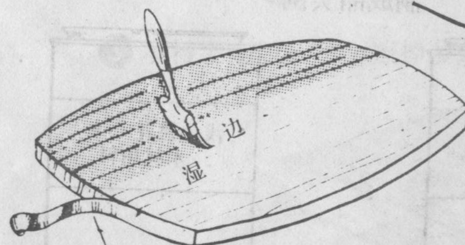


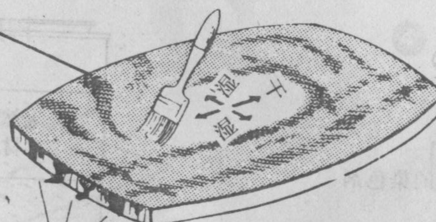


染 色 方 法

❶ 涂染色漆

涂抹要迅速而小心，然后干燥一天，从一边开始涂抹，否则会出现补抹不匀现象

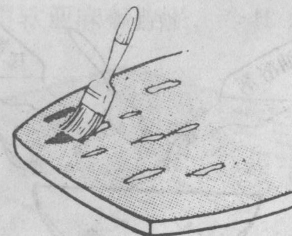




染色以前，板端加封条，防止染色时留下溢流痕迹

❷ 必要时涂用颜色吻合的上等亮油，然后使其干燥

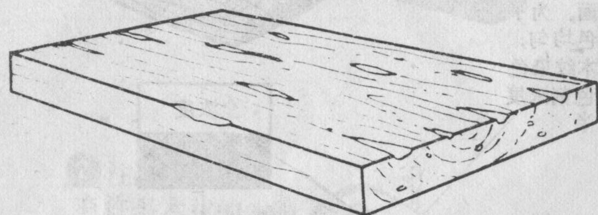
（使用合适的染色剂，与上等亮油混合，用小刷子涂抹）



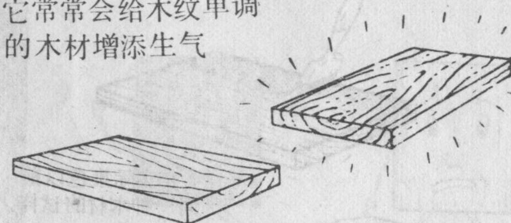


木材填料入门

❶ 木材填料用来填充结构粗糙的木材

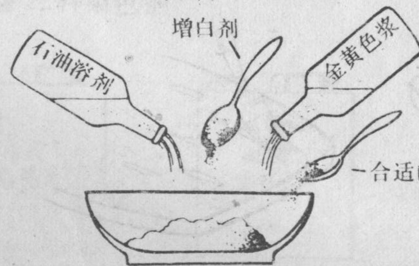


❷ 它常常会给木纹单调的木材增添生气

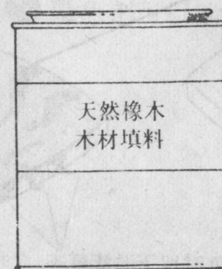


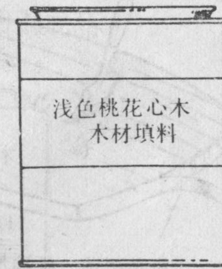
❸ 它们是用各种物质制成，可以购买标准木材颜色的制成品

自制



制成品实例



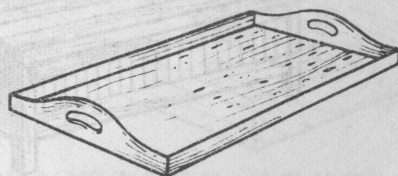


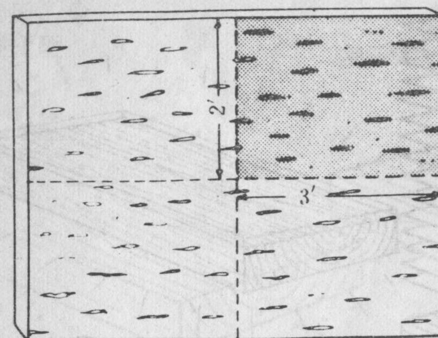
填料的用法

简要说明

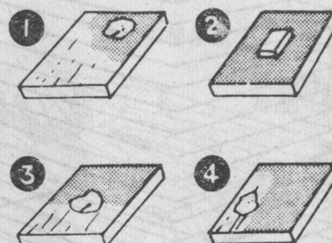


在填充实际木料之前，一定要在同一种木料的试样上试填



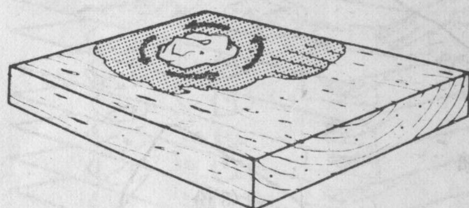


填充大面积木料时，要分区填充，因为许多种填料干燥速度很快，在最终干燥之前须完成①②③④作业

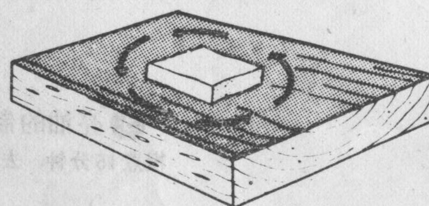


填充方法

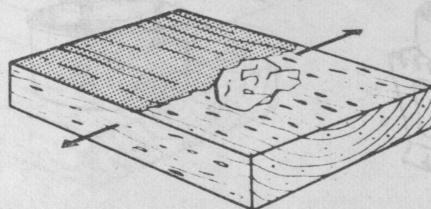
❶ 用布擦上填料



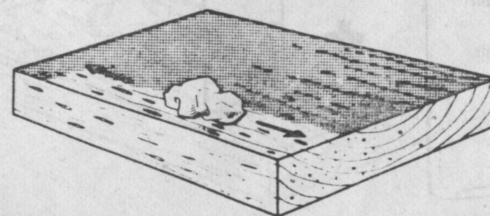
❷ 用毡垫压入填料



❸ 填料半干时，用布擦掉多余的填料



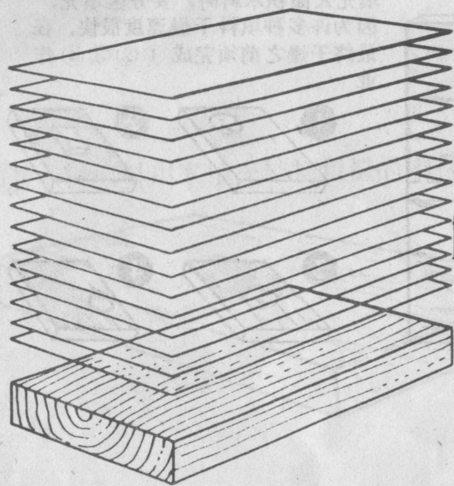
❹ 最后用软亚麻布擦平，令其干燥

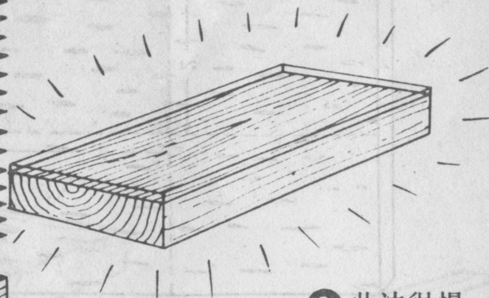


油 饰 入 门

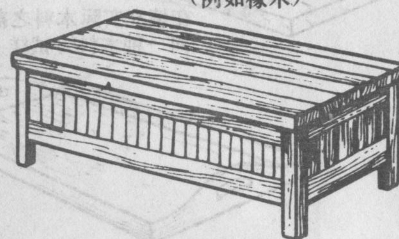
❶ 目的

用油层构成亚光、柔光或闪光涂层

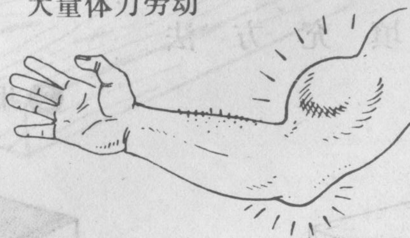




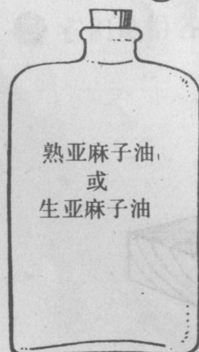
❸ 结果提高耐久性，外表美观，油还会改进某些木材的颜色（例如橡木）



❷ 此法很慢，需要花费大量体力劳动



❹ 亮油

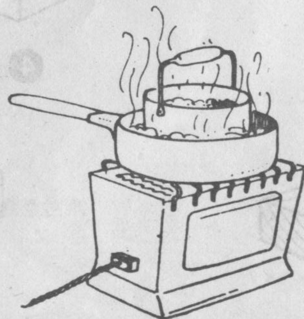






❺ 亮油的制备

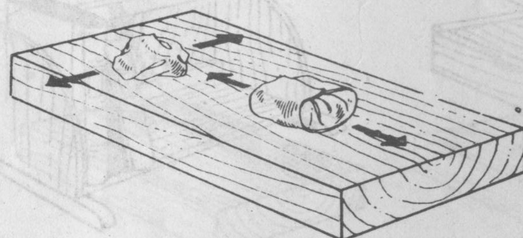
慢煮15分钟，去火，加入1/8份松节油



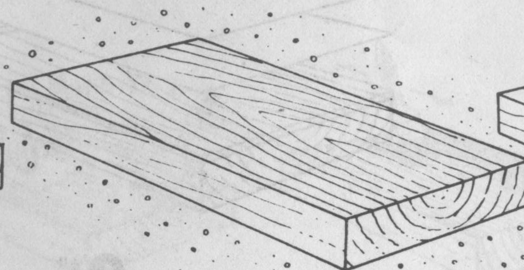


油饰

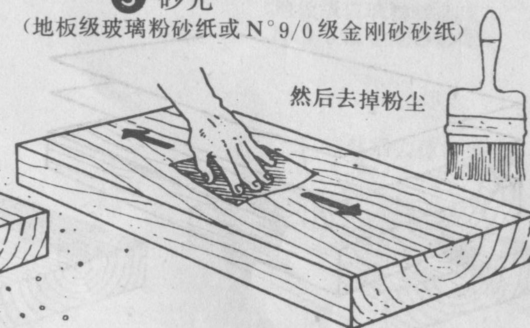
❶ 用一块布涂油，然后用一块外包油毡的卷把油涂擦到木材表面上



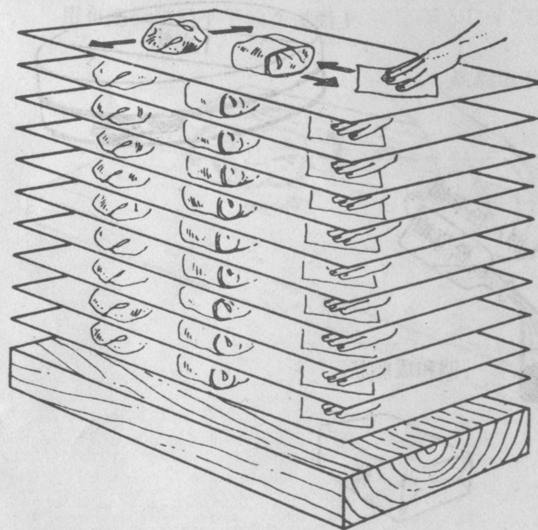
❷ 放置一天，令其干燥变硬



❸ 砂光
（地板级玻璃粉砂纸或N°9/0级金刚砂砂纸）

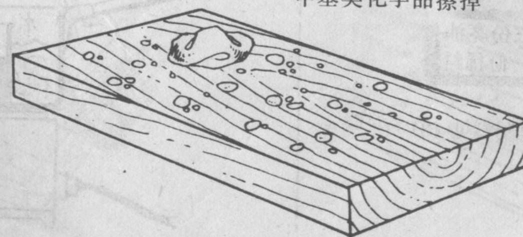


❹ 上述①②③作业重复，次数越多，油饰效果越好



注：如果表面渗出油，则用甲基类化学品擦掉

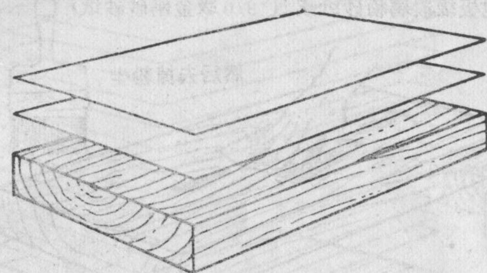


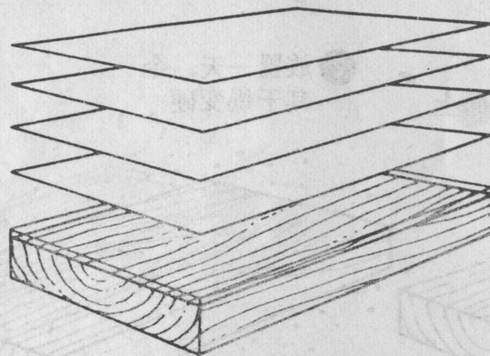


半腊光入门

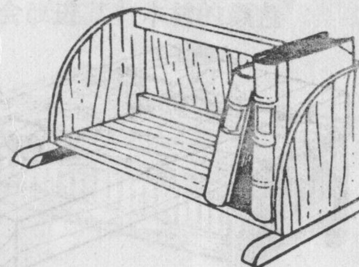
❶ 目的

用几层亮油打底，然后精心擦蜡，构成亚光，柔光或亮光涂层





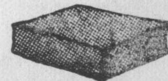
❷ 这是一种得到十分耐久的饰层的简单快速的方法



❹ 蜡

自制材料

蜂蜡及松节油



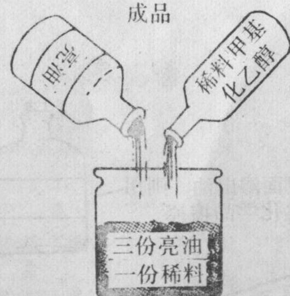


成品



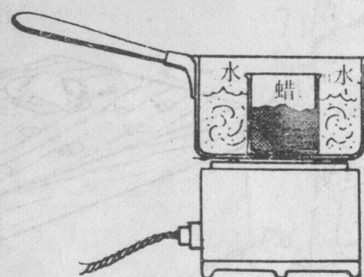
❸ 亮油

成品

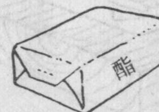


注：自己配制参见 131 页

蜂蜡加热



调和成脂状



❶ 涂一层
(干燥 20

❺

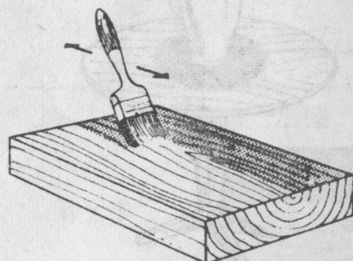
用布把少



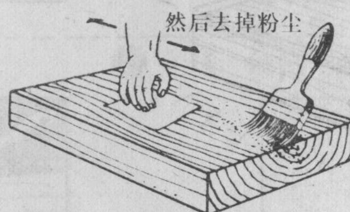


半 腊 光

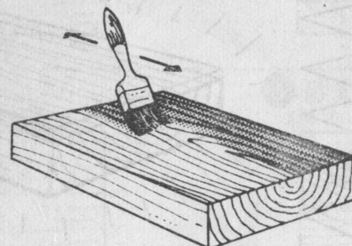
❶ 涂一层亮油
(干燥 20 分钟左右)



❷ 砂平
(地板级玻璃粉砂纸或 N°9/0 级金刚砂砂纸)



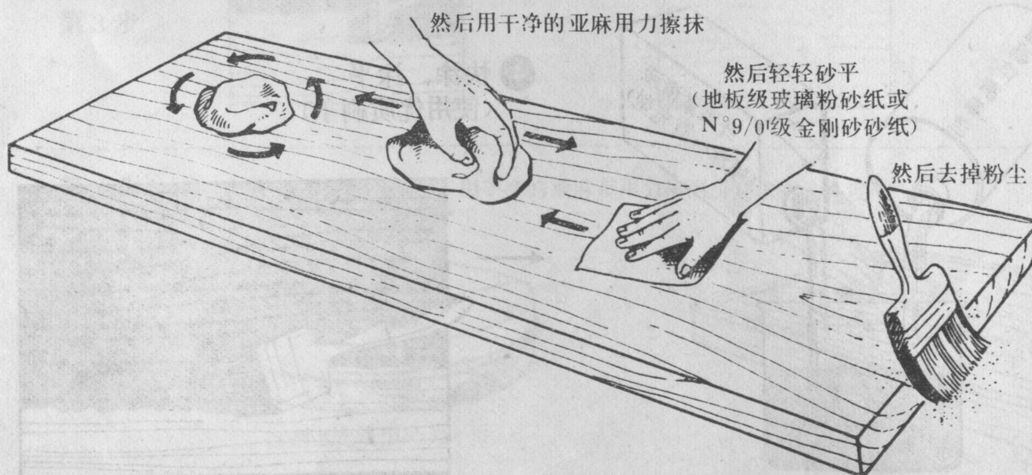
❸ 涂另一层亮油
(干燥 $1\frac{1}{2}$ 小时左右)



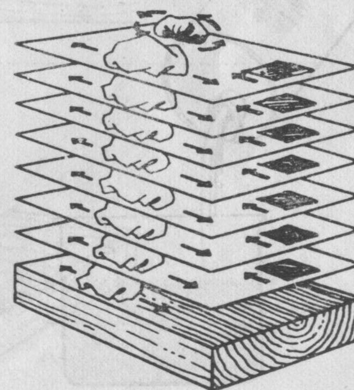
❹ 砂光
(地板级玻璃粉砂纸或 N°9/0 级金刚砂砂纸)



❺
用布把少量蜡平平涂在表面上



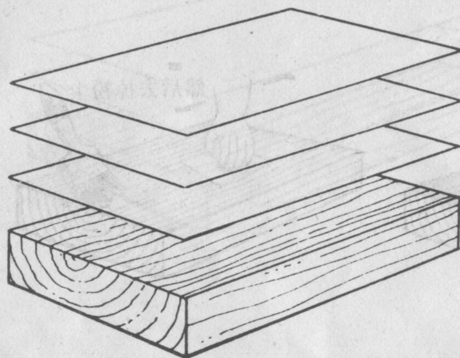
注：第⑤步作业重复次数越多，涂饰效果越好



纤维素清漆涂饰入门

❶ 目的

用纤维素漆构成亚光、柔光或亮光涂层

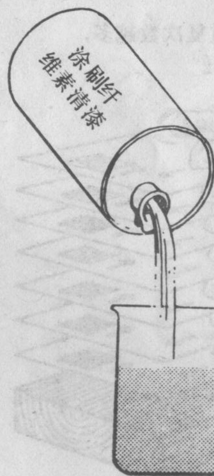


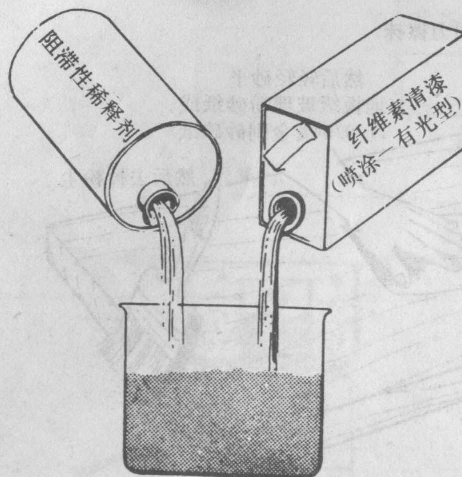
❷ 某些纤维素清漆涂刷简便迅速，生成耐久涂层



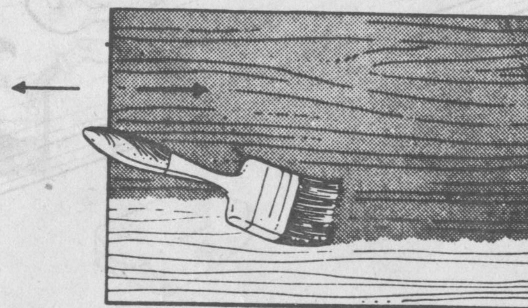
❸ 清漆

刷涂纤维素清漆可以购买成品，还有多种牌号的喷涂纤维素清漆加入阻滞性稀释剂后可变成涂刷用清漆





❹ 快涂、涂平
(使用优质刷子)



纤维素清漆亚光到柔光涂饰

第1步

❶ 涂一层漆

❷ 干燥40分钟左右

❸ 砂光（N˚00级砂纸）

然后去掉粉尘

第2步

❶ 涂一层漆

❷ 干燥、硬化一天

❸ 砂光（N˚000级砂纸）

然后去掉粉尘

第3步

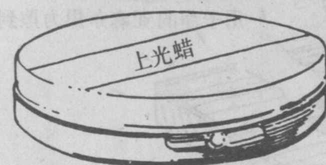
❶ 涂一层漆

❷ 干燥、硬化一天

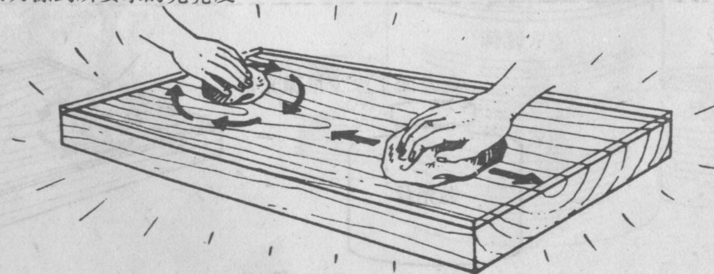
❸ 砂光（N˚000级砂纸）

然后去掉粉尘

第4步　表面涂少量上光蜡，用干净的亚麻布用力擦到所要求的光亮度



自制上光蜡详见124页



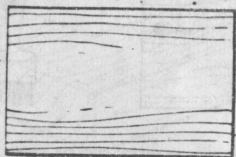
纤维素清漆柔光到亮光涂饰

第1步

❶ 涂一层漆



❷ 干燥 40 分钟



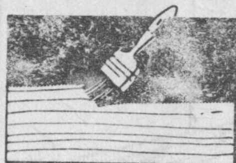
❸ 砂光
（N° 240 级金刚砂细砂纸）



然后去掉粉尘

第2步

❶ 涂一层漆



❷ 干燥一天



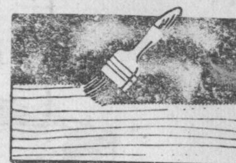
❸ 砂光
（N° 320 级金刚砂细砂纸）



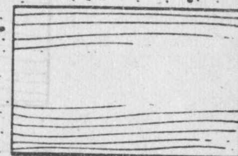
然后去掉粉尘

第3步

❶ 涂一层漆



❷ 干燥、硬化一天



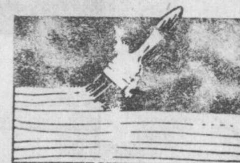
❸ 砂光
（N° 400 级金刚砂细砂纸）



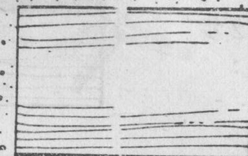
然后去掉粉尘

第4步

❶ 涂一层漆



❷ 干燥、硬化一天



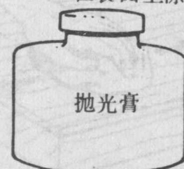
❸ 砂光
（用棉花擦细抛光膏）

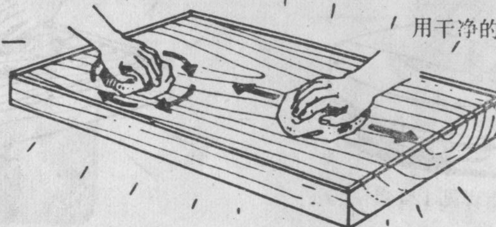


然后用干净的布擦净

第5步

在表面上涂少量抛光膏



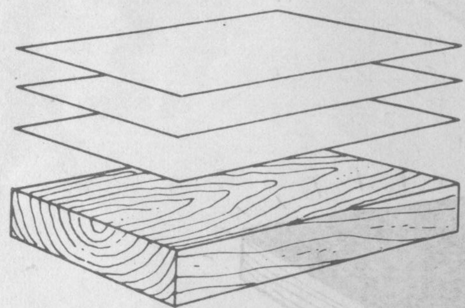


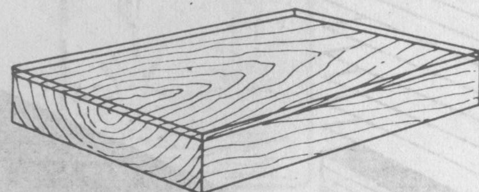
用干净的亚麻布用力擦到所要求的光亮度

触媒涂饰入门

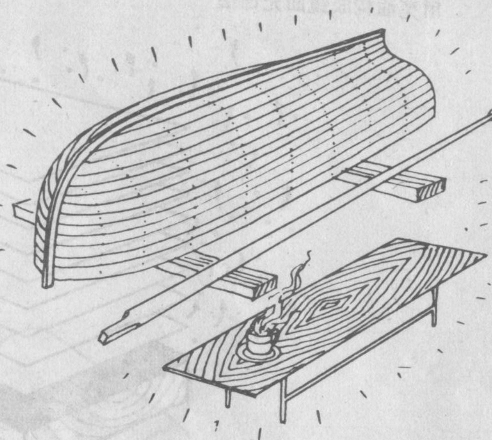
❶ 目的

用漆层构成亚光、柔光或亮光涂层

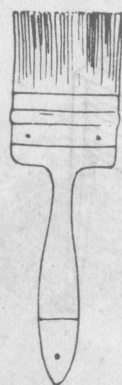


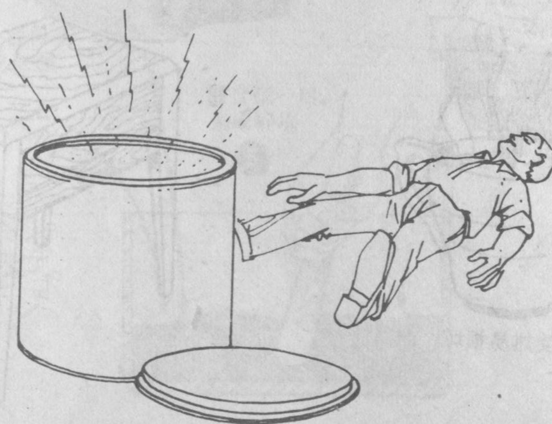


❷ 这是一种很慢的方法，但用某些牌号可制得十分耐用的饰层



❸ 购买时要注意购买"可涂刷"型牌号，而且要无毒的型号





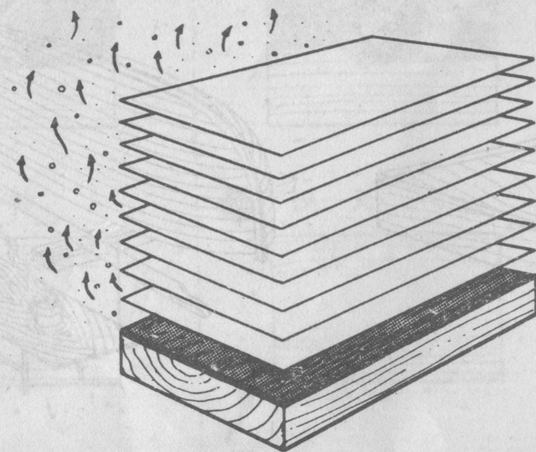
❹ 调制与涂施按制造厂说明进行

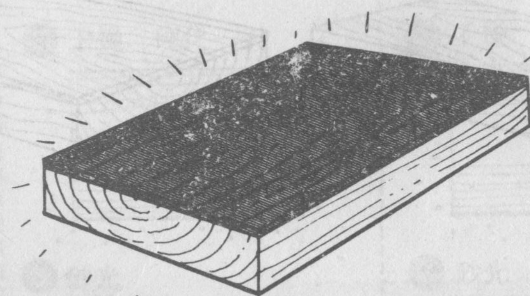


光 饰 入 门

❶ 目的

用亮油构成镜面光饰层



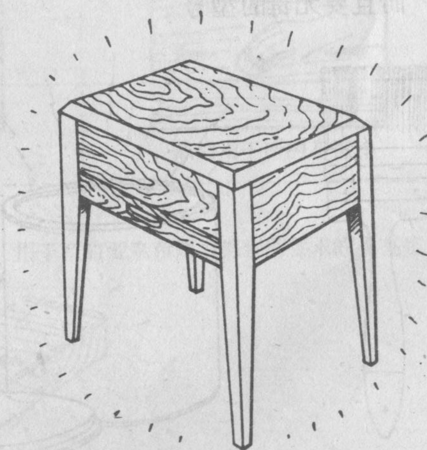


❷ 此法很慢，操作要十分小心，但涂饰结果非常漂亮

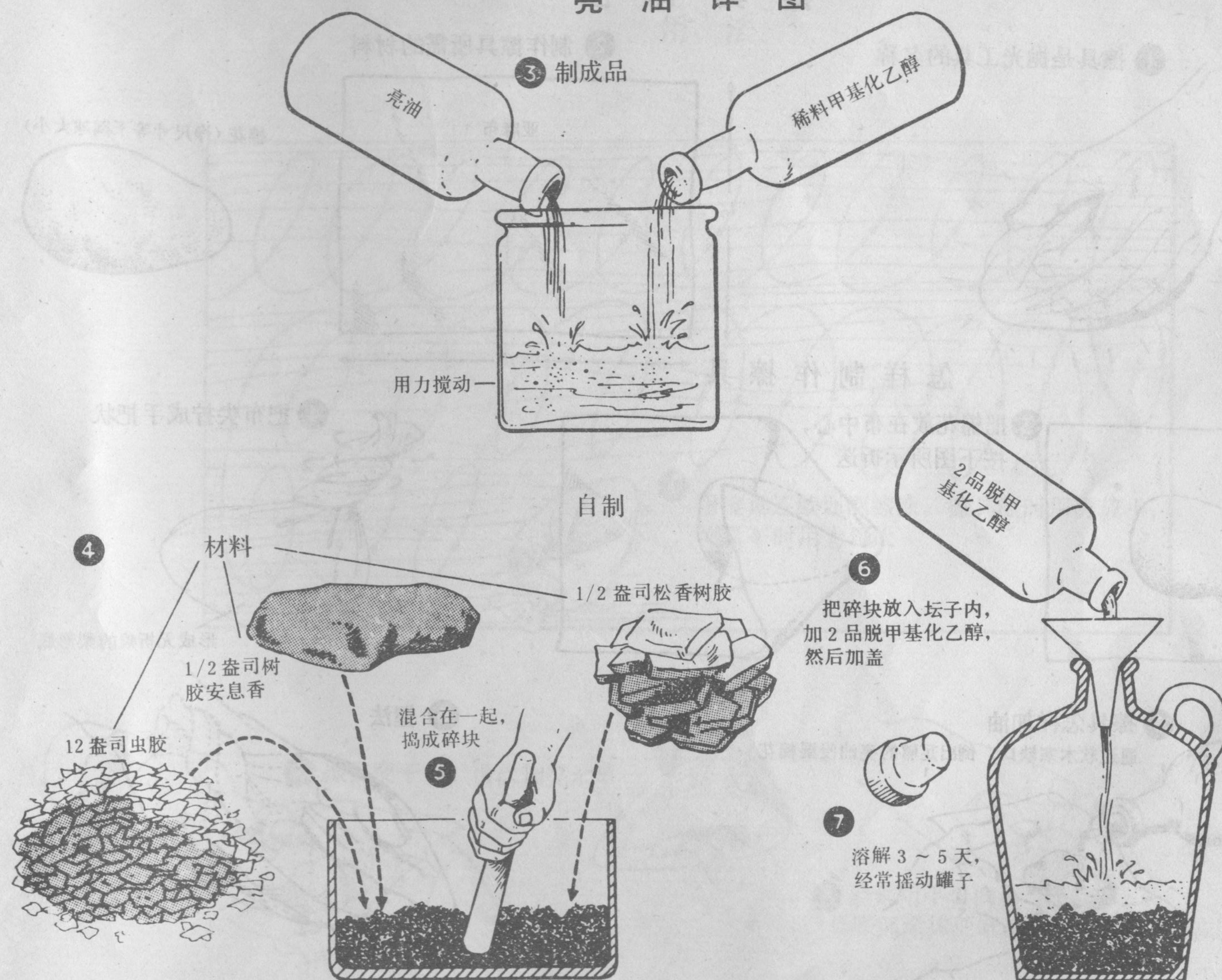




受热易损坏



亮 油 详 图



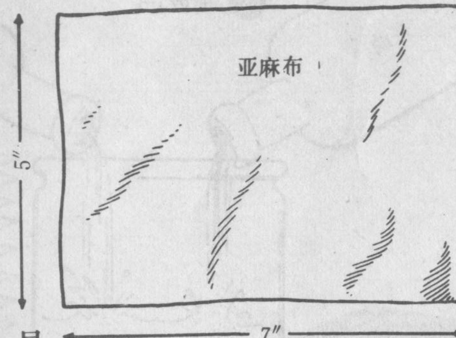
3 制成品
亮油
稀料甲基化乙醇
用力搅动
自制
4 材料
1/2 盎司松香树胶
1/2 盎司树胶安息香
12 盎司虫胶
5 混合在一起，捣成碎块
6 把碎块放入坛子内，加 2 品脱甲基化乙醇，然后加盖
2 品脱甲基化乙醇
7 溶解 3 ~ 5 天，经常摇动罐子

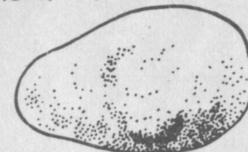
擦 具 详 图

❶ 擦具是抛光工具的名称



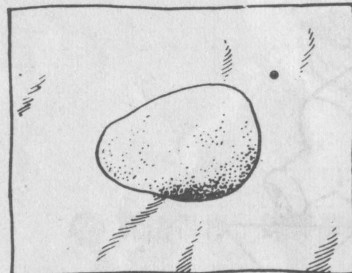
❷ 制作擦具所需的材料

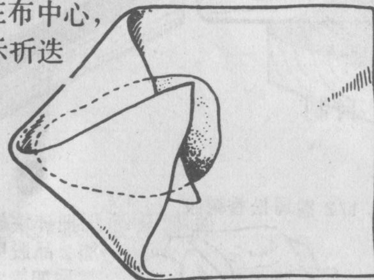




怎样制作擦具

❸ 把棉花放在布中心，按下图所示折迭





❹ 把布尖拧成手把状



❺ 擦具怎样加油

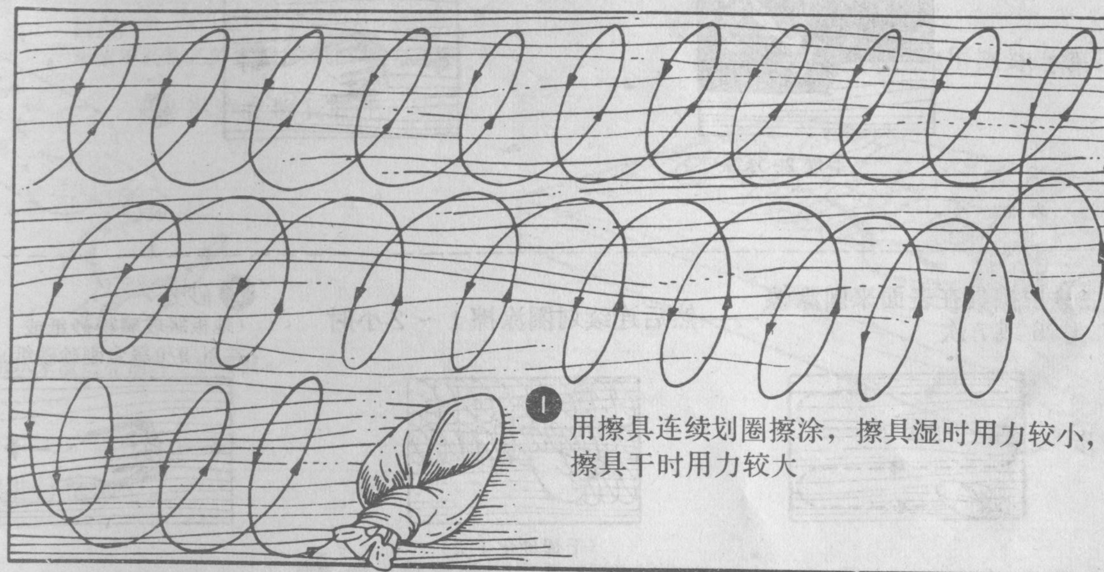
通过软木塞缺口，倒出足够的亮油浸湿棉花



❻ 握法



用法



❶ 用擦具连续划圈擦涂，擦具湿时用力较小，擦具干时用力较大



❷ 擦具变干后，再次加亮油

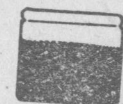




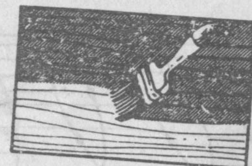
❸ 经常用手尖向擦具底部涂抹亚麻油，使擦具容易滑动

抛 光：1

第 1 步


全浓度亮油

❶ 刷一道油


（干燥 20 分钟）

❷ 砂光

（地板级玻璃粉砂纸或者 N°9/0 级金刚砂砂纸）



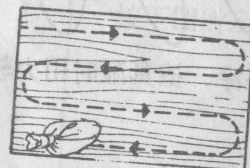
然后去掉粉尘

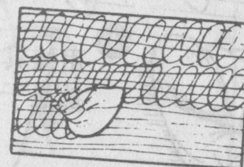


第 2 步


3/4 亮油
1/4 甲基化乙醇

❶ 用擦具在表面来回涂擦 6 或 7 次——然后连续划圈涂擦 1～2 小时




（干燥硬化 1 天）

❷ 砂光

（地板级玻璃粉砂纸或者 N°9/0 级金刚砂砂纸）



然后去掉粉尘

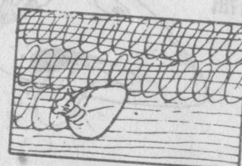


第 3 步


2/3 亮油
1/3 甲基化乙醇

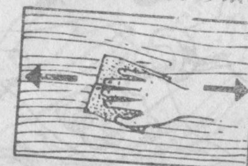
❶ 用擦具在表面来回涂擦 6 或 7 次——然后连续划圈涂擦至表面质量达到要求




（干燥硬化 1 天）

❷ 砂光

（地板级玻璃粉砂纸或者 N°9/0 级金刚砂砂纸）



然后去掉粉尘



掉粉尘



然后去掉粉尘



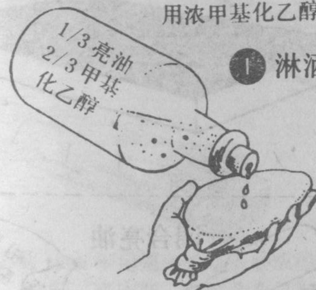
然后去掉粉尘

抛　光: 2

最后一步
（醇洗）

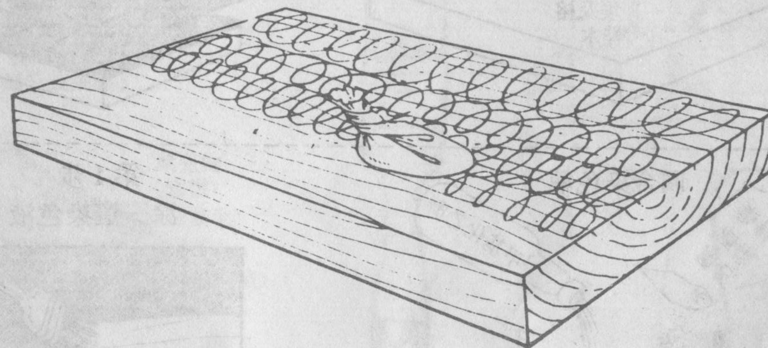
目的
用浓甲基化乙醇溶液去掉油和擦具痕迹

❶ 淋洒在擦具底上



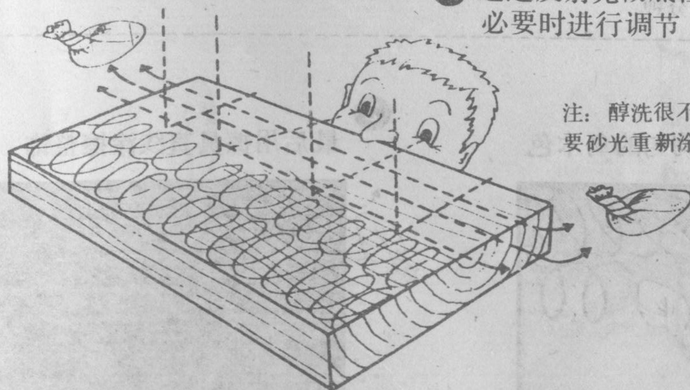
（使用从未浸过亮油的专用擦具）

❷ 细心快速地用擦具连续划圈



❸ 直线涂擦进行整饰

❹ 通过反射光彻底检查加工件，
必要时进行调节



注：醇洗很不容易，因为可能需要砂光重新涂亮油层，再次醇洗

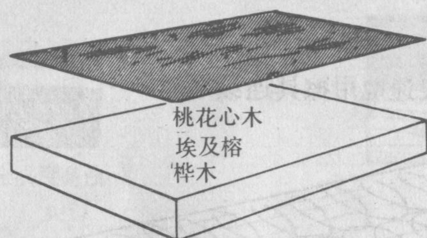
❺ 擦具在空气密封罐贮藏
（已经用出来的擦具比未用过的新擦具好使）

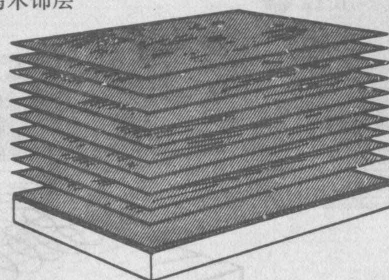


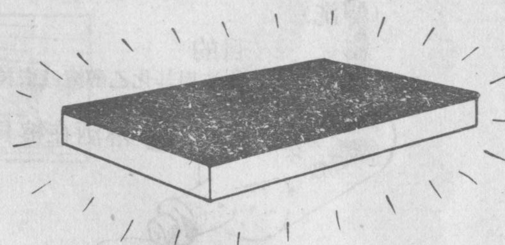
假 乌 木 化

目的

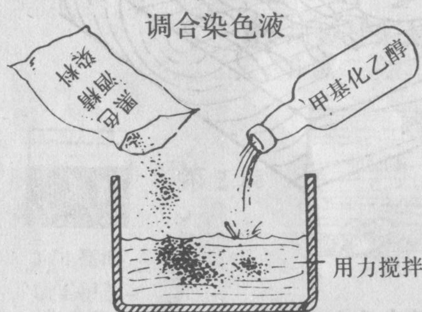
涂黑色打底，然后涂数道黑色亮油，构成均匀的乌木饰层







调合染色液



第1步

涂一道染色液



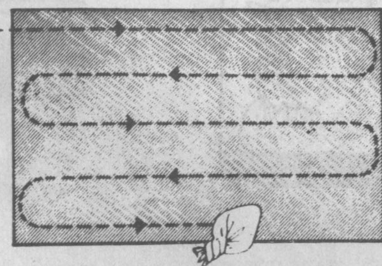
干燥十分钟

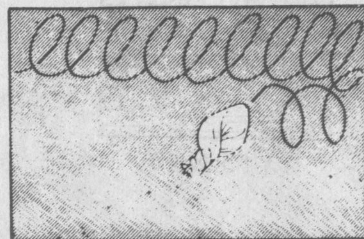
调合亮油



第2步

❶ 用擦具在表面往复涂擦6或7次——然后连续划圈涂擦成均匀的乌木色





❷ 最后用擦具直线涂擦整饰

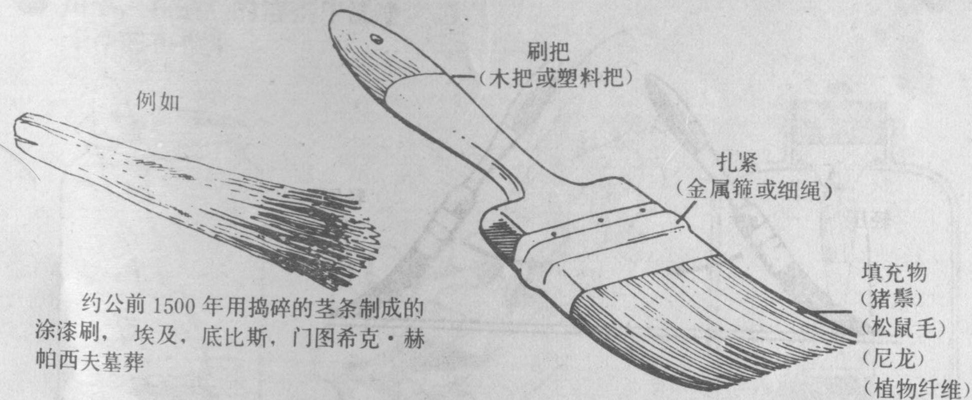


(干燥并硬化一天)

刷 子 入 门

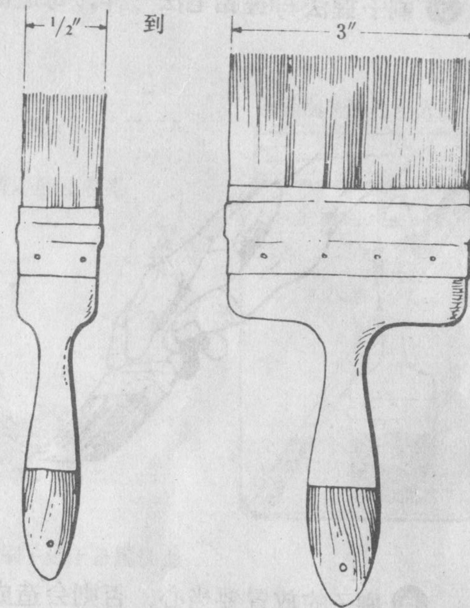
❶ 刷子的使用已有数千年历史

❷ 现在刷子用各种材料制成



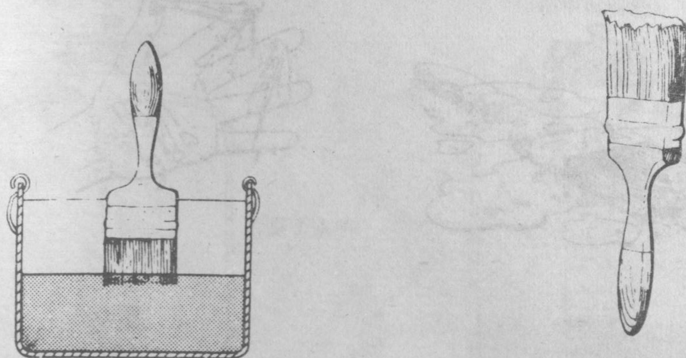
约公前1500年用捣碎的茎条制成的涂漆刷， 埃及，底比斯，门图希克·赫帕西夫墓葬

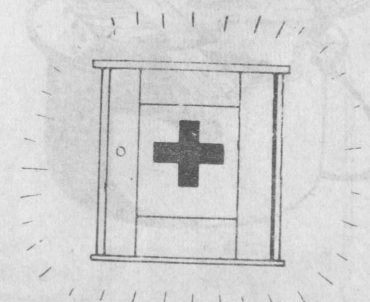
❸ 普通尺寸范围



❹ 蘸漆

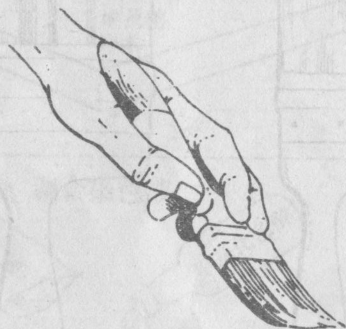
仅用刷尖蘸漆，蘸漆或亮油量越少，涂饰效果越好

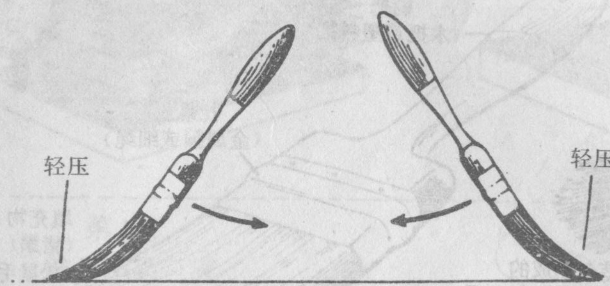




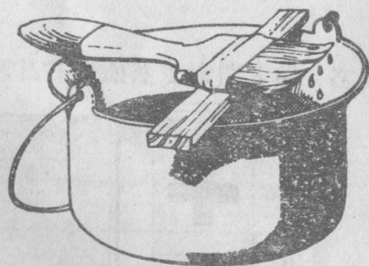
简 要 说 明

❺ 刷子握法与握铅笔法一样，每道涂刷行程要长

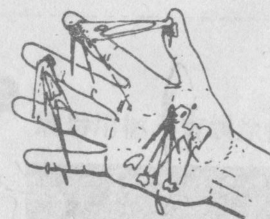




❻ 刷子的放置要当心，否则会造成下述结果

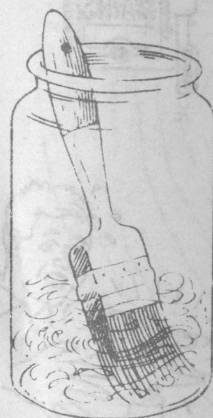
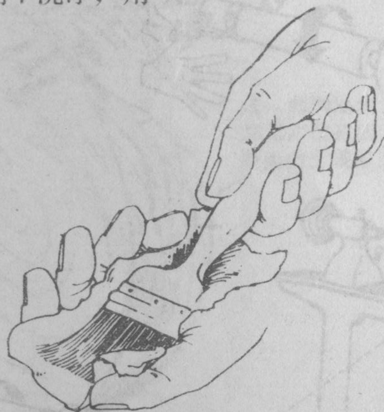




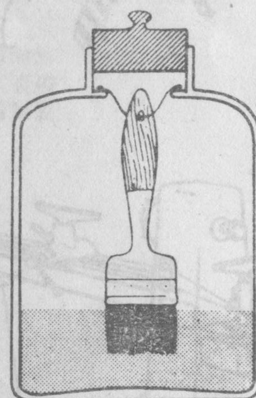


刷子的维护

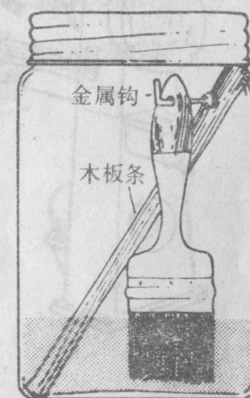
❶ 用毕，在适当的溶剂中洗净，用干净的布揩干

❷ 贮藏

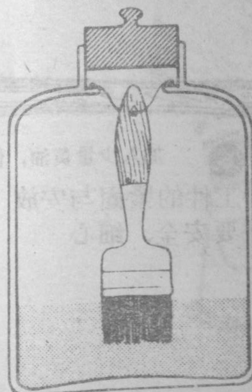

浸入适当的液体，使刷子处于备用状态



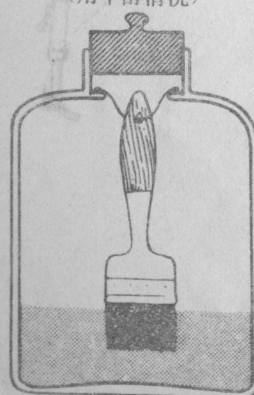


❸ 清洗和贮藏实例

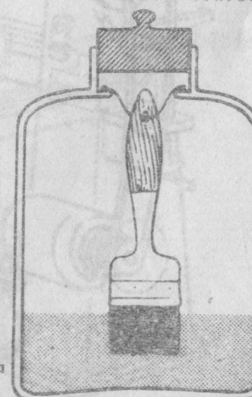
涂油漆刷
（用油漆稀料清洗）



涂亮油刷
（用甲醇清洗）



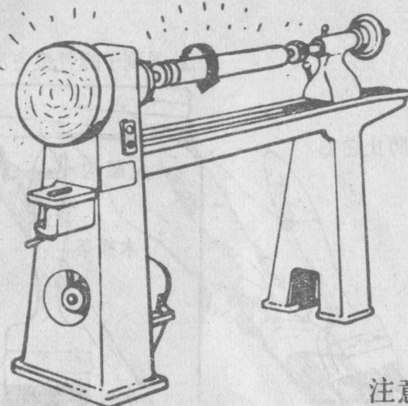
涂纤维素清漆刷
（用纤维素清漆稀料清洗）



镟 活 入 门

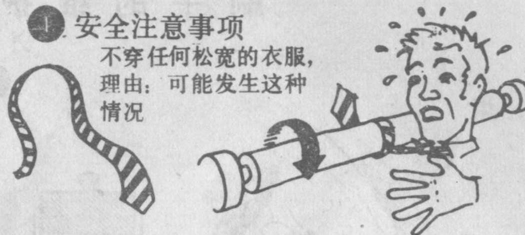
目的

通过旋转加工获得合适的饰面

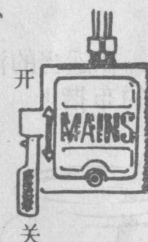


① 安全注意事项

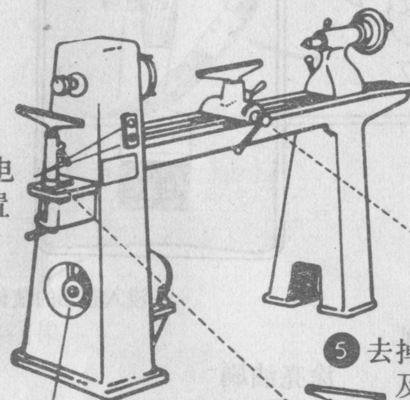
不穿任何松宽的衣服，
理由：可能发生这种
情况



② 关掉总
电源



③ 注意二次电源按钮位置

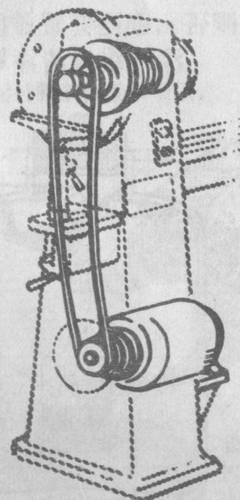




理由：可能发生这种情况

⑤ 去掉T型刀架
及其附件





④ 调节皮带轮皮带，
达到所需转速

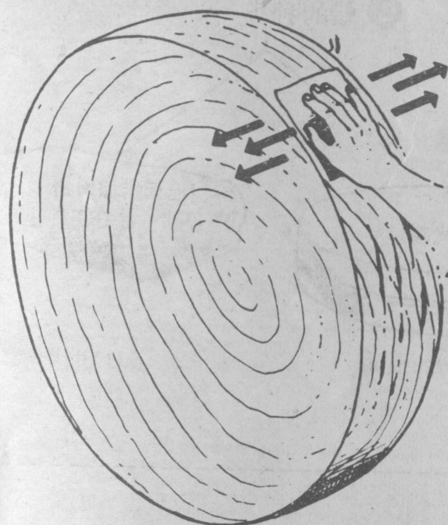


加入少量黄油，使转动灵活

⑥ 工件的紧固与安放
要安全、细心

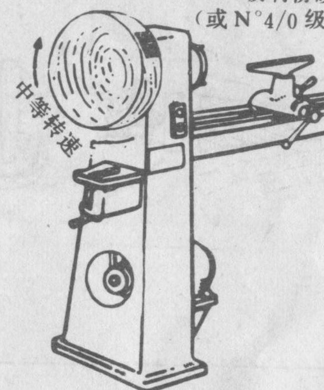


镟活作业的表面准备



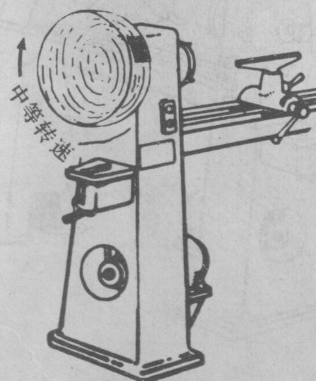
注：磨削运动方向沿加工件横截面，否则表面会出现深道划痕

❶ 采取安全措施以后，接通电源，进行磨削
（N°1玻璃粉砂纸）
（或N°4/0级金刚砂砂纸）

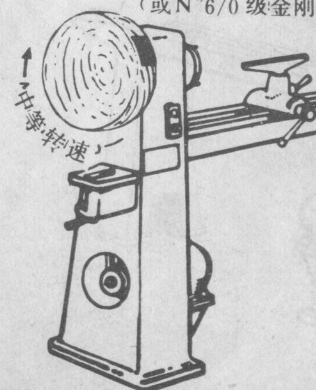


然后去掉粉尘

❷ 用湿抹布浸湿
（使松纤维竖起）



❸ 干燥以后，砂光
（N°0级玻璃粉砂纸）
（或N°6/0级金刚砂砂纸）



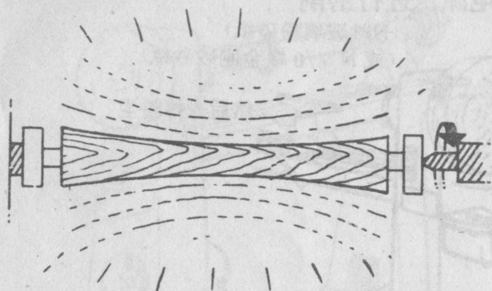
然后去掉粉尘

镟件的涂饰：1

蜡光

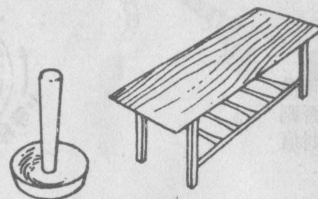
❶ 目的

用一层薄蜡形成亚光或柔光饰层



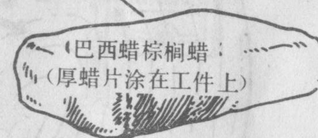
❷ 是一种快速方法

应用实例



❸ 蜡的种类

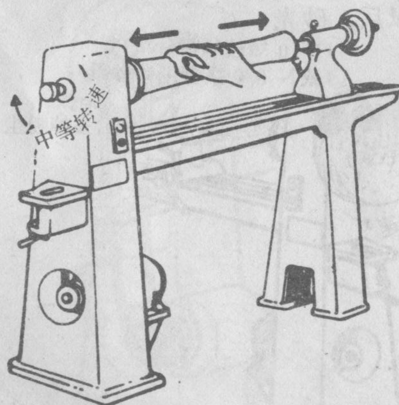




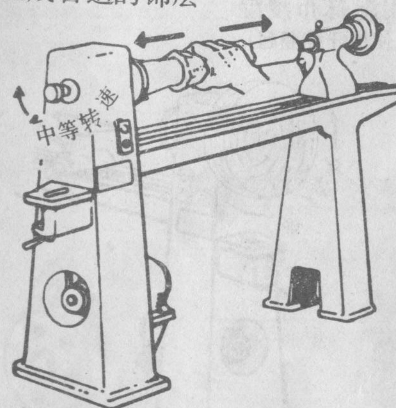
（详见 124 页）

用法

❶ 把涂蜡的布或巴西蜡棕榈蜡厚片在工件上擦动，防止堵塞



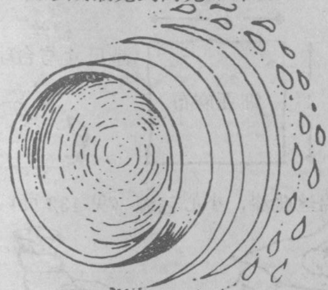
❷ 用干净的布不断擦涂，添加新蜡，重复上述操作，直到生成合适的饰层



镟件的涂饰：2
半 油 饰

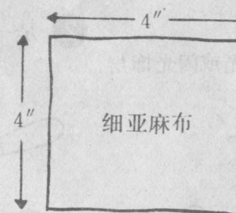
❶ 目的

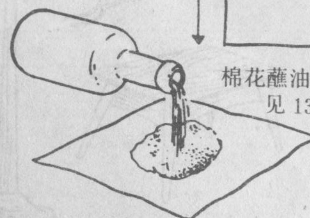
用粘接剂打底，用亚麻油涂层形成锻光到高光泽饰层



❷ 是一种慢法







见 132 页

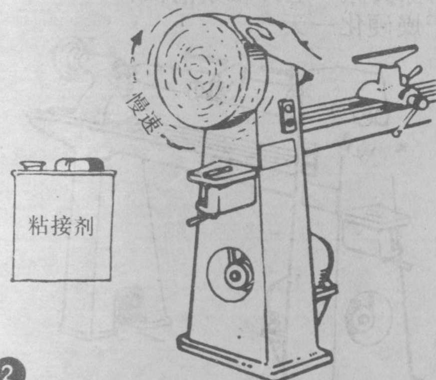
❸ 用擦具涂粘接剂和亚麻油





用 法

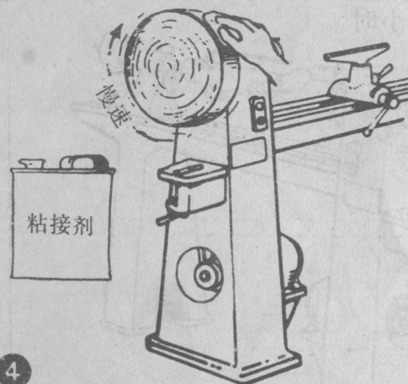
❶ 用擦具涂施足量的粘接剂，干燥 2 小时



❷ 用棉花蘸抛光膏砂光，然后用布擦净



❸ 用擦具再涂足量的粘接剂，干燥硬化一天



❹ 用棉花蘸抛光膏砂光，然后用布擦净





❺ 用擦具涂一薄层亚麻油，用干净的布擦至所要求的亮度



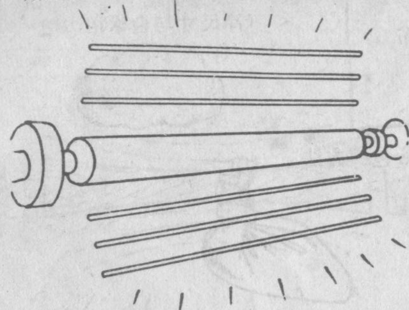


镟件的涂饰

纤维素清漆涂饰

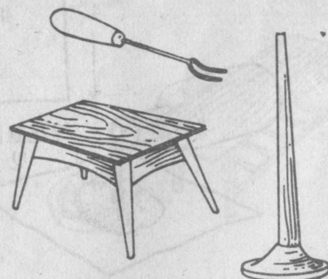
1 目的

用几道纤维素清漆构成亚光，柔光或闪光饰层



2 是一种慢法

应用实例

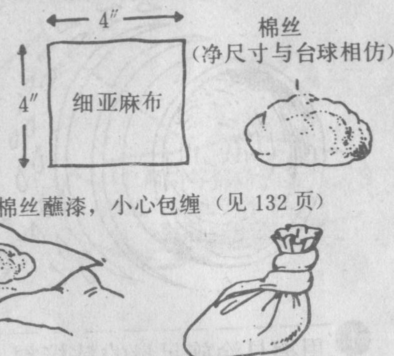


3 调合



纤维素清漆
见 126 页

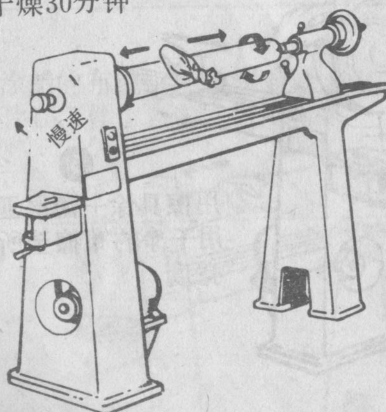
4 用擦具涂施方法



棉丝蘸漆，小心包缠（见 132 页）

用 法

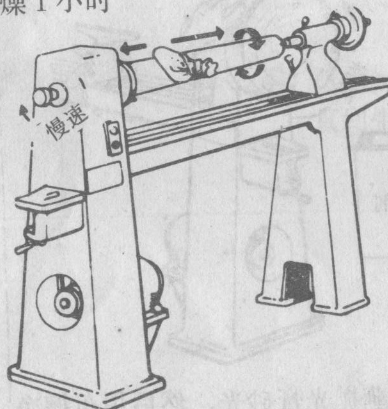
1 用擦具涂一层纤维素清漆，干燥30分钟



2 用棉丝蘸抛光膏砂光，用布擦净



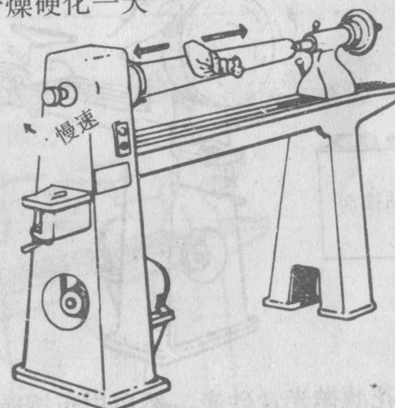
3 用擦具涂一层纤维素清漆，干燥 1 小时



4 用棉丝蘸抛光膏砂光，用布擦净



5 用擦具涂一层纤维素清漆，干燥硬化一天



用棉丝蘸抛光膏砂光，用布擦净



最后，用细亚麻布蘸蜡或抛光膏擦至所需亮

附：英制与公制度量衡单位对照表

类别	英制	折合公制
长度	哩	1.609 公里
	呎	1.829 米
	码	0.914 米
	呎	30.48 厘米
	吋	2.54 厘米
重量	吨	
	长吨	1.016 公吨
	短吨	0.907 公吨
	英担	50.802 公斤
	磅	0.454 公斤
	盎司	28.35 克
	打兰	1.771 克
体积	加仑	4.546 升
	夸脱	1.136 升
	品脱	0.568 升
	及耳	0.142 升